NATUR CYMRU
Nature of Wales

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- Carmel NNR
- Coastal change
- Monitoring guillemots
- Restoring wetlands
- Y tywyddiadur
- Red squirrel disease
- Motorway madness

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GOLYGYDDOL EDITORIAL

I bwy bynnag sy'n angerddol dros natur, mae Cymru yn lle da i fyw ynddo. Wrth olygu'r cylchgrawn hwn caf f'atgoffa yn gyson o'r brwdfrydedd sydd gan gynifer o bobl dros fyd natur, a chymaint o waith gwerthfawr sy'n cael ei wneud er budd pobl a'r amgylchedd. Eto i gyd, mae arsylwadau ymarferol yn cadarnhau rhywbeth arall – sef bod byd natur yn dirywio. Yn ddiweddar dywedodd un o'n tanysgrifwyr y dylem 'wynebu realiti a chyhoeddi erthyglau deifiol, bachog'. Mae hyn wedi gwneud imi ystyried i ba raddau y mae'r cylchgrawn yn cofnodi'r dirywiad hwn – o du pwysau cynyddol fel aredig hen dir pori, neu bethau mwy dramatig fel adeiladu traffyrdd. A yw'r erthyglau'n gwir gynrychioli'r problemau? Yn sicr, rwyf o'r farn y dylai wneud hynny: rhan o'n pwrpas yw hyrwyddo bioamrywiaeth a thanio trafodaethau agored am gyflwr yr amgylchedd.

Os ydych yn derbyn fod y syniad o ddod â thri sefydliad sydd â chyfrifoldebau amgylcheddol gwahanol iawn at ei gilydd i greu cwango anferthol – sef Cyfoeth Naturiol Cymru (CNC) – yn syniad da, eto i gyd bydd y sefydliad newydd angen amser i ddod i drefn a dygymod â'r pwysau mawr sydd ar ei gyllideb. O'r herwydd, mae nifer o sefydliadau amgylcheddol yn wynebu hin rewllyd, ac nid yw'r cylchgrawn hwn, sydd wedi cael cefnogaeth wych yn y gorffennol gan y cyrff a unwyd i greu CNC, yn ddim gwahanol.

Erbyn i chi ddarllen hwn, gobeithir bydd gennym 'llysgennad' newydd wedi'i leoli'n de Cymru, fydd yn cymryd drosodd oddi wrth ein rheolwr marchnata egnïol a thalentog, Huw Jenkins. Os ydych yn meddwl y gallech helpu gynyddu cryfder y cylchgrawn, cysylltwch â ni. Yn olaf, rwy'n cymryd cyfnod sabothol, ac yn trosglwyddo'r baton i banel golygyddol. Byddant yn edrych ar y swydd o'r newydd wrth iddynt chwilio am awduron newydd: rwy'n edrych ymlaen yn eiddgar at rifynnau'r Gaeaf a'r Gwanwyn.

For anyone who is passionate about nature, Wales is a good place to be. Editing this magazine constantly reminds me of the enthusiasm of so many people for the natural world, and how much really valuable work is being done to benefit people and environment together. Yet first hand observations confirm something else – that the non-human world is everywhere in decline. A subscriber recently remarked that we should 'face up to reality more and published some hard-hitting, pithy articles'. That has made me reflect on how well this magazine records this deterioration, whether from cumulative pressures like the ploughing up of old pastures, or more dramatic ones, like the building of motorways. Does the balance of articles properly represent the problems? I certainly believe that it should: part of our purpose is to champion biodiversity and stimulate open debate about the state of the environment.

If you accept that the idea of bringing three organisations with very different environmental remits into a super-quango, Natural Resources Wales (NRW), is a good one, there is still bound to be a time-lag while the new organisation settles down, and the issue of a budget under severe pressure. Many environmental organisations are facing an icy blast as a result, and this magazine, which has had great support from NRW's three component organisations in the past, is no exception.

By the time you read this, we hope to have a new 'ambassador' based in south Wales, to replace our energetic and talented marketing manager, Huw Jenkins. If you think you could help increase the strength of the magazine, please get in touch. Finally, I am taking a sabbatical, and handing the baton to an editorial panel. They will bring fresh eyes to the job as they search out new authors; I'm looking forward eagerly to the Winter and Spring editions.

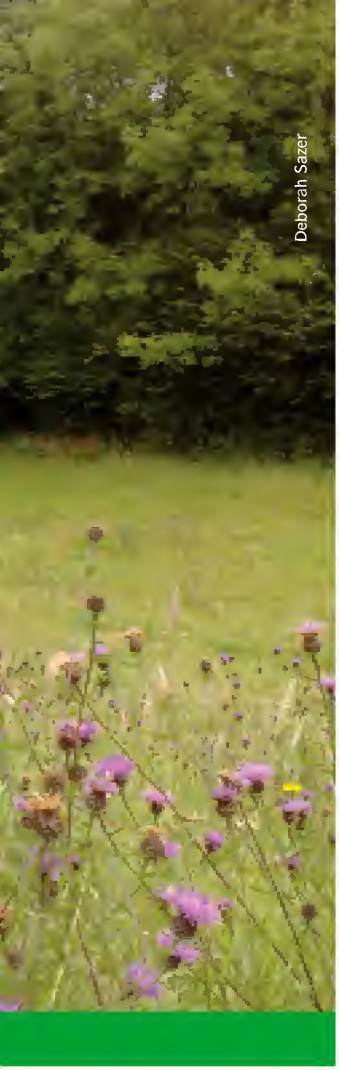
James Robertson

Carmel nature reserve: a landscape of surprises

Often the best places for wildlife defy definition. Carmel NNR is an example, with its intimate landscape concealing a mixture of woodland and grassland habitats, complete with vanishing lake or turlough. It is a richly rewarding place to be associated with, but has also had its share of difficulties, as ***DEBORAH SAZER*** *explains.*

Most people rushing between Cross Hands and Llandeilo have no idea that they are passing through one of Carmarthenshire's least known and most magical nature reserves. Carmel, a Wildlife Trust of South and West Wales (WTSWW) reserve, is a mosaic of ancient and secondary ash-hazel woodland on rocky limestone knolls, intertwined with fingers of glades and neutral grassland. Celebrated ecologists Oliver Rackham and George Peterken have highlighted Carmel's unique rich mix of habitats. Peterken extols Carmel as possibly the only wood meadow in the UK, similar to eastern European wood/pasture mosaics. Carmel beautifully illustrates the natural 'fuzzy boundary' between grasslands and woodlands that he discusses, despite our habit of parcelling them into separate ecological boxes.

The reserve lies just south of Carmel village, with a signed carpark off the A476 and many permissive paths. Despite the easy access, you can relish the solitude, only interrupted by the occasional dog walker.



Deborah Sazer

Carmel Site of Special Scientific Interest (SSSI) was further protected as a National Nature Reserve (NNR) and European Special Area of Conservation (SAC) following the strong local Campaign for the Protection of the Gwenlais Valley to prevent quarrying of its underlying limestone in the 1990s.

I was privileged to work as ecologist for The Grasslands Trust (TGT) at Carmel, continually discovering new corners and crannies, new species and new management challenges. TGT managed the reserve from 2005 until 2010. I worked with Charli Evans, the man on site for most of this time, who covered many roles and engaged a wide range of volunteers and locals. The Trust restored long-abandoned woodland management, creating a more varied ash-hazel age-structure and increasing the deadwood habitat essential for a world of invertebrates, lower plants and fungi. Scrub clearance, followed by cattle and pony grazing, recovered the unimproved meadows, and hay-meadow management of semi-improved pastures created a flower-rich and varied reserve alive with insects and birds. That's why TGT's 2012 demise into receivership was heart-breaking for us, threatening the future of the site and all our achievements. The frustration was increased by the knowledge that we still had grant-funding for the conservation work, but the Trust was unable to raise the resources to support itself as an ongoing charity.

John Anderton

Woodland patchwork

Thankfully, the Countryside Council for Wales/Natural Resources Wales stepped in to purchase the reserve from Tarmac, and it is now in the safe hands of WTSWW under a long lease. Grantscape and Cwm Environmental have continued to fund the future crucial management of the site, and a Carmel Appeal is underway to raise additional funds (see the WTSWW website). The change over just a few years of minimal management was clear – a sustained, well-funded programme is essential to

Herb Paris *Paris quadrifolia* Cwlwm cariad

maintaining such a vital site. Happily, scrub clearance, bracken rolling, small-scale woodland management and grazing are now underway, in the very capable hands of WTSWW Officer for Carmarthenshire Rebecca Killa and her volunteer team.

My woeful memories of rounding up Hari and Sidan, the two Carneddau ponies who had just begun to manage the site, have been wiped out now that they are back with two companions, immediately tackling the rhos pasture/wet heath on 'Garn south'. With two sightings of marsh fritillary butterflies elsewhere on the reserve this year, we hope that grazing will encourage the spread of enough devil's-bit scabious to support this threatened butterfly, which breeds within a few kilometres of Carmel.

Limestone

Carmel's landscape is at the heart of its special charm, lying along a narrow east-west double ridge of carboniferous limestone sandwiching a dry valley. The limestone is exposed on both natural and quarried cliffs; these are interspersed with deeper brown earths on the flatter areas. The reserve is overlooked by ridges of old red sandstone to the north and millstone grit to the south, with their contrasting acidic and peaty soils.

The main feature of Carmel's NNR designation is the Pant-y-llyn turlough, a mile to the east of the reserve. This seasonal lake, the only one in mainland Britain, is fed by pure rainwater dissolving the underlying bedrock, creating underground caves and channels. Greater horseshoe and Natterer's bats hibernate in some of these caves, along with the herald moth and the locally-distributed tissue moth. These underground processes continually re-form Carmel's undulating ground surface and create a growing number of expanding sinkholes (including several that alarmingly lie either side of the A476!)

Garn, to the east of the road, has glorious displays of spring woodland flora, pockets of ancient woodland, a rich developing limestone flora in the quarries and fabulous views from the very top of the hill. To the west, Pwll Edrychiad (roughly translated as view of the pool or pit) lies in a large bowl of sinkhole-studded neutral grassland, with a spot of rich limestone grassland near older small quarries, rushy rhos pasture, and a warm (sometimes even sun-baked) south-facing slope of purple moor-grass, heather and gorse which is bursting with reptiles and stonechats.

The Reserve's ecological diversity and peaceful atmosphere belie its long industrial history, dominated by limestone quarrying and burning. Many of the remains have been swallowed up by the woodlands,

but Carmel's entire industrial history can be read throughout the site, from its 17th century origins (when lime was first used as a soil improver), through many stages to its climax and sudden collapse at Garn in the late 19th century. Dozens of quarries, kilns, huts, spoil heaps, tracks and tramways remain, with two of the best-preserved kilns revealed by recent coppicing.

Carmel's plentiful hazel and ash are evidence of a coppicing tradition, but, interestingly, the 19th century kilns were fired mainly by anthracite coal from the adjacent South Wales coalfield. Charcoal was made at Carmel, but it was used to power nearby iron forges. Despite this wealth of industrial activity, farming continued on the surrounding fields as it had for centuries. Today's field boundaries and distinctive woodland/grassland mosaic are illustrated on 18th century maps.

Woodlands and grasslands

Each individual wood has its own character, reflecting variations in geology and past management. Pockets of ancient woodland with wych elm, spindle and cherry survive. Carmel NNR holds the only Carmarthenshire population of the nationally uncommon lily-of-the-valley, and one of the few county sites for Herb Paris, associated with moist, ancient calcareous woodlands. However, much of the woodland is secondary, re-colonising quarries and spreading into the glades in the last century, as illustrated by a series of post-WW2 aerial photographs.

John Anderton

Spring flowers

You are welcomed to Garn's coppiced woods not just by a spring carpet of bluebells, dog's mercury, wood anemone and wild garlic, but also by plentiful sweet woodruff, wood avens, yellow archangel, pignut, early purple orchid and, unusually for a woodland, swathes of meadow saxifrage.

John Anderton

Pwll Edrychiad, on the west of the reserve

Woodland grades into unimproved neutral grassland throughout the reserve. The highlight is one of the county's largest populations of the uncommon greater butterfly-orchid, which migrates around Pwll Edrychiad, popping up in unexpected spots. Common bird's-foot trefoil, eyebright, common-spotted orchid, yellow rattle, betony, common cat's-ear, lady's mantle, common knapweed and devil's-bit scabious are frequent. The last two plants sweep down two slopes in the middle of Garn, providing a colourful and vital late-summer nectar source for hundreds of butterflies, bees and hoverflies.

A rich calcareous flora is developing in the quarries and on some slopes, following the clearance of non-native invasive cotoneaster and other scrub. A selection of sedges and grasses have sprung up, including the shimmering quaking grass. Colour is provided by wild thyme and marjoram, burnet-saxifrage, fairy flax, the lemon-yellow mouse-ear hawkweed and spikes of agrimony. My favourite, the subtly beautiful carline thistle, keeps its straw-coloured flowers through the winter.

The semi-improved fields around the reserve edges were classified as improved in 1992; aerial photographs show the bright green glow of nitrogen-drenched and probably re-seeded deserts. It will take many years to recover, but they are now a haze of flowering grasses and yellow-rattle, and slowly gaining new species as a result of a mid summer haylage cut, with aftermath cattle grazing, no fertilisers and no pesticides. Small populations of yellow-rattle were increased by sowing in 2012 because it is semi-parasitic on grasses, weakening them and making room for less competitive species to spread. It has been extremely successful, along with eyebright, another grass semi-parasite, which has expanded on its own. Patches of common knapweed, common bird's-foot trefoil, common cat's-ear and the occasional whorled caraway now wave in the summer breeze.

The wetter areas at Pwll Edrychiad are dominated by sharp-flowered rush, with plentiful common marsh-bedstraw, greater bird's-foot trefoil, whorled caraway, lousewort, tormentil and devil's-bit scabious.

Garn quarry, site of the marsh fritillary butterfly

Deborah Sazer

John Anderton

Slow worms *Anguis fragilis* Nadroedd defaid

Garn south is a sphagnum-dominated, fairly open sward of rhos pasture and wet heath, with heather, cross-leaved heath, bilberry, cotton-grass and, unusually for this habitat, a large patch of common twayblade.

Species

The reserve rings with spring bird song – well over 40 species have been recorded, many with conservation priorities including bullfinch, spotted flycatcher, willow tit, stonechat, wood warbler, green woodpecker and barn owl.

A dormouse-nibbled nut inspired us to set up a volunteer dormouse monitoring programme. So far only blue tits, woodmice and tree bumblebees have turned up in the boxes, but hopes are high for this autumn.

The species-richness of the habitats is reflected in populations of all eight common bumblebee species, brown-banded carder bee and forest cuckoo-bee. Sixteen butterfly species have been seen, including UKBAP dingy skipper and small heath, with nearly 200 moths so far.

As soon as volunteers placed refugia on Pwll Edrychiad's recently-cleared gorse slope, we were rewarded with grass snakes, common lizard, frogs, toads, voles, and a large population of slow-worms at all life-stages, from tiny juveniles to gravid females and mating pairs.

And I don't even have space to mention the mosses, liverworts, lichens, fungi and ferns. I can't praise the place enough. Do come along and discover Carmel's secrets for yourself.

Dr Deborah Sazer *is an ecological consultant working in southwest Wales. Previously, she managed the Mynydd Mawr Marsh Fritillary Project for Butterfly Conservation Wales and Countryside Council for Wales.*

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Gwarchodfa Natur Carmel

Cymysgedd unigryw o galchfaen caregog, coetir a glaswelltir niwtral yw Gwarchodfa Natur Carmel. Mae'n gartref i'r unig lyn tymhorol ym Mhrydain ac mae ganddo dreftadaeth ddiwydiannol yn cynnwys cloddio a llosgi calchfaen, a choedlannu a chynhyrchu golosg. Mae'r safle yn cynnal sawl rhywogaeth brin megis ystlumod pedol mwyaf a Natterer, Brithegion y Gors (ieir bach yr haf) a Chwlwm Cariad, sy'n gysylltiedig â choetiroedd hynafol calchaidd llaith. Mae'r gribell felen yn helpu lleihau ffrwythlondeb rhywfaint o dir fferm, gan ganiatáu cymysgedd cyfoethocaf o blanhigion y ddôl i ffynnu.

All photos: Tim Birkhead

Guillemots on Skomer - *the value of long-term population studies*

Guillemots *Uria aalge* Gwylogod

In an earlier article (Guillemots on Skomer, NC 30:33) ***TIM BIRKHEAD*** *described how long-term monitoring studies had revealed the secrets of this endearing seabird. Such monitoring depends on dedication, continuity of approach, and funding. With funding in doubt, the author puts the case for the methodology behind more than four decades of data.*

Skomer Island, together with the nearby islands of Skokholm and Grassholm, hold some of the most important UK seabird colonies. In 1962 the first warden of Skomer Island National Nature Reserve, David Saunders, initiated what were to become some of the first long term censuses of UK seabirds.

Saunders' annual census on Skomer comprised counts of the total number of individuals or nests of many of Skomer's twelve seabird species. His motivation for doing so was concern over the decline of certain species, notably puffins *Fratercula arctica* and guillemots *Uria aalge*, whose decrease in number was obvious from previous accounts and photographs taken in earlier decades (e.g. Buxton & Lockley 1950).

The value of Saunders' annual counts became even more important as guillemot numbers continued to decline through the 1960s, first as a result of the *Torrey Canyon* oiling incident in the spring of 1967 in which at least 15,000 seabirds died, and second as a result of the Irish

Seabird Wreck in the Autumn of 1969 in which at least 12,000 birds, mainly guillemots died.

From 1959 Skomer was run by the Nature Conservancy, but leased to, and managed by, the West Wales Field Society. The NC became the Nature Conservancy Council in 1973, and was dismantled in 1991 by Environment Secretary Nicholas Ridley (presumably because it spoke up too loudly for conservation). It was replaced in Wales by the Countryside Council for Wales (CCW), which took over the ownership of Skomer. However, the day-to-day management, including the seabird counts started by Saunders, remained the responsibility of the then West Wales Wildlife Trust.

Following ongoing declines in seabird numbers both on Skomer and elsewhere in the UK, David Lack and Chris Perrins at the Edward Grey Institute (EGI) in Oxford initiated puffin and guillemot studies on Skomer with a view to better understanding their population biology. The EGI had had a long relationship with the Pembrokeshire Islands (mainly Skokholm) and in 1970 Perrins had started a population study of the razorbills *Alca torda* on Skokholm with Clare Lloyd as the named researcher. On Skomer, starting in 1973 Ruth Ashcroft began a DPhil study of puffins. I was lucky enough to spend the 1972 season on Skomer studying guillemots, prior to starting my DPhil in 1973. The main remit of the two studies was a better understanding of the population biology of each species and the hope of halting the decline.

A long involvement

I have been back to Skomer almost every summer since 1972 to continue studying what has become my favourite bird. But it's more than that. The guillemot is long-lived and it requires a long-term study to properly understand its population biology and behaviour.

When I started field work in 1973 my priority was to find a way to accurately census guillemots. As a result of *Operation Seafarer* in 1969-1970 – the first concerted effort to estimate the number of UK seabirds – it had become clear that assessing seabird populations was more difficult than anyone imagined (Cramp et al. 1974).

Guillemots were thought to be especially difficult to count, partly because they often breed in very dense aggregations, but also because they did not make nests, so converting counts of individuals into breeding pairs was problematic. For this reason, counts were often reported as 'individuals', although

Ringing new chicks enables annual monitoring of survival rates

sometimes 'individuals' and 'breeding pairs' were assumed to be the same. Buxton & Lockley (1950: 76), for example, reported that in 1946 "there were .... 5000 guillemots on Skomer cliffs.. or approximately that number of pairs".

Developing a reliable census method meant establishing the exact number of breeding guillemot pairs in a particular area. I achieved this through patient, protracted daily observations of breeding birds, noting the precise location of individuals and using the presence of an egg to indicate a breeding pair. On average, each hundred individual birds on the breeding ledges represented 67 breeding pairs. In guillemots one member of a pair incubates the egg or broods the chick continuously; the additional birds on the ledges are off-duty breeders, each often standing beside its partner, but also include immature, non-breeding individuals (Birkhead & Nettleship 1980).

The second aspect of monitoring I tackled was to establish the best time to make counts both within a season and within any particular time of day. My counts showed that numbers were least variable during the incubation period and during the middle part of the day (Birkhead 1977). It was also obvious that conducting whole island counts – as David Saunders had done – was extremely laborious, so a sampling regime was necessary. I selected three discrete cliff faces as 'study plots' and counted those on ten separate occasions each June to provide an average, together with a 'standard deviation' (a measure of the variability of those counts around the mean). Crucially, these three study plots, either alone or combined, showed a strong positive correlation with the whole island counts, and therefore provided a reliable index of the entire population size. Started in 1973, these counts became incorporated into the general monitoring of guillemot numbers on Skomer and have been continued each year since.

Population biology

Monitoring numbers is just one way of assessing the health of a population and it tells us nothing about the processes underlying changes in population size. Therefore each year since the mid-1980s my colleagues and I have measured several other aspects of guillemot population biology, including the proportion of adult guillemots that survive from one year to the next, the survival of guillemots, the timing of breeding, breeding success, and the rate at which guillemot chicks are fed, and their diet. Together these data, which have been accumulated over a span of 40 years, provide a comprehensive understanding of how the Skomer guillemot population operates. The remarkable – and rewarding – thing is that every season I discover something new and my understanding of what makes a guillemot tick grows each year. The marine environment is far from static. My long-term view makes me cautious about quick diagnoses based on simple assays.

All these measurements give us the best chance of detecting and understanding changes in the guillemot's fortunes. Counts of individuals on their own can be misleading. For example, we found that when an oil spill or a 'wreck' (as in 2014) kills huge numbers of birds (as evidenced by large numbers of recoveries of Skomer-ringed guillemots), the counts of individuals on the cliffs the following year may not seem very different. This is probably because the margin of error in counts mask real changes and/or because young, non-breeding birds detect the 'gaps' in the population and alter their behaviour accordingly.

Guillemots do not build nests but lay their eggs on bare rock

Using counts of individuals to determine the health of a population is like asking a doctor to assess the state of your heart on the basis of only an ECG (electrocardiograph) trace. Your ECG reading may be normal because your heart is working twice as hard as it should. You appear to be okay on the basis of a single, superficial assay, while in reality you are on the way to a heart attack. It is obvious that the more comprehensive the monitoring system, the more likely it is to detect a health issue. Our long term study of guillemots effectively provides a comprehensive annual health check for the Skomer guillemot population. The decision in early 2014 by Natural Resources Wales (NRW) to terminate the

funding for the long term study of guillemots is disappointing since the monitoring system they assume will replace it will not deliver the essential information on survival, productivity or chick feeding rates and diet.

Normal variation and significant change

The key to successful monitoring is knowing what kind of change you hope to be able to detect. This in turn depends on knowing how variable features like the timing of breeding or breeding success normally are between years. The Skomer management plan (WTSWW unpublished document) specifies 'ideal' levels of population size, survival and breeding success for guillemots and other seabirds. The monitoring systems that are used must be capable of detecting appropriate levels of variation in different aspects of the birds' biology, including numbers and breeding success, across years.

Measuring these different aspects of seabird biology is not a trivial task: it entails dedication and hard work. Moreover, if you are going to do it you have to be confident that the results generated are reliable. To be reliable they have meet certain minimum

criteria. Monitoring must be consistent from year to year, regardless of the personnel involved. To ensure consistency, personnel must be appropriately trained and supervised. It is also crucial that personnel conducting monitoring are not allowed to 'make improvements' since any changes to methodology jeopardise the consistency that is the key to the success and value of monitoring.

The most important point is that high quality monitoring cannot be achieved with a 'light touch' or without proper supervision or scrutiny. By insisting on methodological consistency, by training and supervising field assistants, and by careful scrutiny of

their results, I believe our monitoring system provides the best possible health check for Skomer's guillemots.

Acknowledgements
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Coed Gwent: adfer y gogoniant

Dechreuodd cyfrifiadau tymor hir o adar môr Prydeinig ar Ynys Sgomer ym 1962, o ganlyniad i bryder bod gostyngiad yn niferoedd rhywogaethau fel palod a gwylogod. Mae gwylogod yn byw am hir ac mae astudiaeth tymor hir yn hanfodol i ddeall bioleg eu poblogaeth a'u hymddygiad. Rhaid i fonitro ddigwydd yn gyson, felly rhaid i bob cofnodwr ddysgu dull dibynadwy o gynnal cyfrifiad. Mae hyn yn cynnwys cyfradd oroesi flynyddol, llwyddiant bridio, a beth sy'n cael ei ddefnyddio i fwydo'r cywion a pha mor aml y cânt eu bwydo. Yn 2014 penderfynodd Cyfoeth Naturiol Cymru roi terfyn i'r cyllid ar gyfer astudiaeth hir dymor gwylogod, oedd yn benderfyniad siomedig.

Gethin Davies

Joining hands to protect peatlands - *partnerships restore two degraded wetlands*

Two separate partnership projects are underway in Snowdonia and Anglesey to restore a large area of degraded wetland habitat. Both are funded by the Welsh Government's Resilient Ecosystems Fund (REF), and will run until February 2015. GETHIN DAVIES and DAVE COWLEY describe what has been achieved so far, what is planned for the final phase, and what benefits are anticipated from this pioneering partnership work.

The *Eryri and Hiraethog Peatland Restoration Project* aims to restore approximately 480ha of peat bogs at various locations throughout Snowdonia and the Denbigh Moors. It will achieve this by blocking artificial drainage ditches, removing unwanted vegetation that has encroached onto these semi-natural habitats, and by repairing field boundaries to allow for controlled grazing of the sites.

It is a collaborative project between five main partners; RSPB Wales, Natural Resources Wales, the National Trust and Dŵr Cymru/Welsh Water, led by Snowdonia National Park Authority (SNPA). Each partner has a vital role to play in the delivery of the project outcomes, bringing their specialist knowledge to the fore in fields such as water management and monitoring, habitat management, vegetation monitoring and experience of peatland restoration.

In total, five sites have been marked for work, varying from lowland to

upland bogs, each slightly different in its ecology due to location, management, and level of past modification. The sites are:

- Tal y Braich Uchaf, Dyffryn Ogwen
- Mynydd Hiraethog and Alwen Reservoir, Denbigh Moors
- Cefngwyn, Migneint
- Coed Aberhirnant, Berwyn Mountains
- Arthog Bog, Arthog

Work began in earnest in November 2013 as local contractors entered two of the sites, Mynydd Hiraethog and Coed Aberhirnant, to start on the ditch-blocking work and to remove seeded conifers. Mowing work was also undertaken on Hiraethog, aimed at improving the vegetation structure for the rich array of birds found in the area, such as curlew and golden plover. By March 2014 approximately 55km of ditches had been blocked, and 15ha of unwanted vegetation removed, including the dreaded Sitka spruce, which has a tendency to encroach onto the bogs from adjacent plantations. In addition, a further 2ha of dense willow scrub was removed at Cors Arthog, with field boundaries and access to the site improved in order to facilitate grazing. In this instance the landowners themselves undertook the work, which provided a valuable source of income for them during the winter months.

Phase Two

The next phase of the project will begin in October 2014, once the bird nesting season has come to an end. Contractors will begin ditch-blocking at Cefngwyn, a National Trust-owned property on the Migneint which has one of the best water vole populations in Wales, and also on smaller sites at Alwen Reservoir and Tal y Braich Uchaf. At Alwen Reservoir Dŵr Cymru will be monitoring the water quality post-blocking, having already undertaken baseline monitoring at the site over the last couple of years. This will give an added dimension to the work as it will be interesting to see whether the grip blocking does indeed have a positive impact on the quality of the water entering the reservoir and, if so, by how much.

It is hoped that during the second phase of the project a further 30km of ditches will be blocked, taking the total to over 80km. Again, local contractors will be used to do all the work, ensuring that the money remains in the local economy. SNPA is able to meet its statutory duty to foster the local economy by using local contractors, many of whom undertake this kind of work during the winter months in order to supplement farming incomes.

Gethin Davies

Baseline monitoring of vegetation on Mynydd Hiraethog winter 2013

As well as the practical restoration work involved, much work is being done to promote the project amongst the residents in the area. This includes having a stand at the Urdd Eisteddfod held at Bala in May 2014; hosting evening talks and open days; and undertaking school visits as part of a wider project called *Moorlands as an Indicator of Climate Change Initiative* (MICCI). MICCI is a citizen science project, set up by the Peak District National Park in 2007, and has since expanded to all areas of the UK. It's a project aimed at encouraging school and college groups of all ages to measure the health of UK peatlands by completing a set of simple experiments out in the field, recording vegetation cover, water table and soil pH. So far, schools from Blaenau Ffestiniog, Ysbyty Ifan and Pentrefoelas have been out to do the work, with more visits planned for the autumn. As well as getting the pupils to do all the hard work, it's an excellent opportunity to get them out in the open and to understand and appreciate the value of the wetlands we're blessed with in the area.

The first mini-constructive wetland on the Cefni Reservoir – before and after

It is hoped that by the end of the project a minimum of 80km of drainage ditches will have been in-filled – that's the equivalent distance from the Great Orme to Wrexham Town Centre! In addition, around 20ha of wetland habitat will have been cleared of unwanted vegetation and over a kilometre of field boundaries repaired, which in total will mean that approximately 480ha of wetland habitat will have been restored, equating to 600 Premier League sized football pitches!

Mawndir Môn

However, it's not only on the mainland that they've been busy! Across the Menai Straits, the Anglesey Wildlife Forum partnership project *Mawndir Môn*, led by Anglesey Council's Biodiversity Team and supported by Natural Resources Wales, North Wales Wildlife Trust, Dŵr Cymru/Welsh Water and Bangor University, have been busy promoting and safeguarding the island's unique fens and internationally important wetlands.

The Anglesey Wildlife Forum identified the Island's wetlands as a priority because of their international importance. Work is concentrating on the wetlands in and around Cors Erddreiniog, Cors Goch and Cors Bodeilio in the east of the Island, all of which are National Nature Reserves, Special Areas of Conservation and/or Sites of Special Scientific Interest, and also around the Cefni Reservoir. Using the funding awarded by the Welsh Government, the aim is to create a number of smaller wetlands to improve the water quality flowing into the Cefni Reservoir, as well as removing some unwanted growth in neglected areas so that grazing animals can be reintroduced. The following priority work is planned by March 2015: 736 meters of fencing to be erected; two gates installed; 3.17ha of scrub control carried out; introduction of sustainable grazing regimes over 8.5ha of land; improved hedgerow maintenance; promotion of pollinator regimes where applicable; and the survey and removal of any identified invasive species within the project sites. Early monitoring of one of the sites, carried out by Bangor University, is already showing positive results with regard to nitrate removal.

As well as work on the ground a number of awareness activities have already taken place, or are planned to take place, during the project. These include press releases, a successful Council Members Day at the Cors Bodeilio site, the creation and distribution of a wetland awareness leaflet, school visits and an Anglesey Wetland Festival in July 2014.

Isle of Anglesey's Biodiversity Champion, Councillor Arwel Roberts, added, "I'm pleased to see local organisations working together on behalf of local communities. Anglesey's wetlands are probably one of its lesser known assets, but I'm confident that the *Mawndir Môn* project will help raise awareness and local pride in this important natural resource."

The value of restoration

First of all, both projects should benefit wildlife by improving habitats and connectivity for an array of plants and animals. These include the vitally important peat-forming sphagnum mosses and accompanying round-leaved Sundew. Birds such as

Gethin Davies

Pupils from Ysgol Bro Aled, Llansannan, undertaking work on Hiraethog as part of the MICCI project in April 2014

the golden plover and curlew will hopefully benefit from improved habitat management, as will other species groups which love wetlands, such as amphibians, reptiles, butterflies, dragonflies, mammals.... you get the picture!

The *State of Nature Report*, published in 2013, confirmed that many of our native species are threatened and face new challenges over the coming decade, one of the most serious being climate change. If we can provide connectivity of wetland habitats in the landscape, this will give animals and plants of all types a greater chance of survival as their natural ranges change. Where similar work has previously been undertaken in the area, we are already witnessing positive changes, with sphagnum mosses recovering so that they are once again the dominant species in many of the restored wetlands, and records of water voles are now popping up where they were once absent.

It is not only wildlife that is due to profit from the work, but also us. We, as a society, derive many services from the natural wetland environments, such as water regulation and flood control. Wetlands are also recognised for their environmental importance in terms of storing carbon. Peat soils in the UK alone store around 3,100 million tonnes of carbon, and in Wales they hold around one third of all carbon found in soils even though they cover only 3% of the land area. Consequently, safeguarding and restoring degraded peatlands can help mitigate climate change as well as protect wildlife habitats and landscapes.

Looking forward, it is hoped that building these partnerships will pave the way for future collaboration on other wetlands restoration projects. iIn turn these projects have been a continuation of previous work over the last decade, such as the LIFE-funded *Active Blanket Bog in Wales* and the *Anglesey and Llŷn Fens* Projects. There is a long list of wetland sites in need of restoration and, with a greater understanding of the work now existing amongst both land owners and land managers, much of the stigma surrounding 're-wetting' the land has disappeared. It may seem ambitious, but who knows, perhaps in time we could see all of north-west Wales's peatlands restored in the not so distant future!

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Gwarchod mawndiroedd

Mae dau brosiect dan arweiniad Awdurdodau Lleol yn dod â natur a phrosesau naturiol yn ôl i lecynnau mawr o wlyptiroedd diraddiedig. Mae Prosiect Adfer Mawndiroedd Eryri a Hiraethog yn adfer bron i 500ha o fawnogydd mewn pum lleoliad trwy gau ffosydd a chael gwared â sbriws Sitca. Y bwriad yw cau mwy o ffosydd yn y dyfodol – rhywbeth a fydd yn creu swyddi i ychwanegu at incwm ffermydd ac yn cynnwys cymunedau lleol. Mae'r ail brosiect, Mawndir Môn, sef prosiect a gaiff ei arwain gan Gyngor Sir Ynys Môn a'i gefnogi gan bartneriaeth o sefydliadau, hefyd yn canolbwyntio ar gyfoethogi gwlyptiroedd. Yn ogystal â bod o fudd i fywyd gwyllt, bydd y dulliau amgenach o reoli dŵr o fudd i bawb.

FIFTY YEARS AGO

North American Land Birds in Wales

Peter Howlett

Grey catbird
Dumetella carolinensis

Amongst all the 'sea beans and nicker nuts' which winter storms bring onto our coastline and islands, a surprising variety of American land birds are swept across the Atlantic to delight and perplex observers here, as DAVID SAUNDERS recounts.

The autumn of 1961 was stormy, with fast moving Atlantic depressions. By 5 October only my wife and I were resident on Skomer Island. As always I made an early morning circuit heading through the North Valley to North Pond, then to the ruined farm buildings, always a good spot for migrants, before continuing to South Valley and back to our house above North Haven.

Close by the house, the cliffs above the landing beach provided shelter from the south-east force 4-5 wind, and I was pleased to find blue tits, blackbirds, robins, stonechats, a great tit and a spotted flycatcher present. Immediately I noticed another bird, with a bright sulphur-yellow breast, about the size of a pied flycatcher but with the build of a warbler. A bird quite unknown to me.

My wife and I watched this bird at intervals throughout the day and took notes. I regretted my tiny salary had not allowed me to purchase a telephoto lens. There was no sign of this bird the following morning. So our field notes were despatched to the Rarity Record Committee of the journal *British Birds* who, after much deliberation, reported:

We are almost certain that the bird was a Blackburnian warbler, a bird of the evergreen woodlands of Manitoba, the Gulf of St Lawrence etc. We cannot be quite sure, however, and feel we must agree with James Baird in the USA that it is best regarded as a 'probable'. Congratulations on taking a very thorough description.

There the matter might have rested but a quarter of a century later the County Bird Recorders Jack Donovan and Graham Rees urged that the record should be re-submitted. This we did in 1988 and both the Rarities Committee and the Records Committee of the British Ornithologists Union accepted the record as being of a Blackburnian warbler, the first for the Western Palearctic (Saunders and Saunders 1992). There have been three subsequent records, on Fair Isle, St Kilda and in Iceland.

Historic records

Today the fact that American land birds can cross the Atlantic is well established and no autumn passes without some being recorded, mostly in northern and western Britain, often including Wales. Although ship assistance may play a part, most occurrences usually coincide with, or occur after, fast moving low-level weather systems crossing the North Atlantic, bringing stormy weather (Elkins 2008).

The first American land bird record for Wales, indeed for Great Britain, is a yellow-billed cuckoo in the autumn of 1832. James Tracy, naturalist and bird stuffer of Pembroke, wrote that the bird had been killed by his brother near Stackpole Court, Pembrokeshire, who said: "I first noticed it on the top of an ash-tree, in the act of feeding on some small insects on the wing; seeing it appeared a nondescript it was shot immediately and nothing more observed as to its habits." The specimen, labelled as the Carolina Cuckoo, was presented by Lord Cawdor to the Natural History Museum. (Mathew 1894).

Since then the yellow-billed cuckoo has occurred in Wales on three occasions, being found dead in 1870 near Aberystwyth, and in 1899 at Craig y Don, Anglesey. The third was seen briefly at Porthclais, Pembrokeshire, on 30 October 1994, an occurrence graphically described by Devonald and Price (1994), the two

Peter Howlett

Yellow warbler *Setophaga petechia*

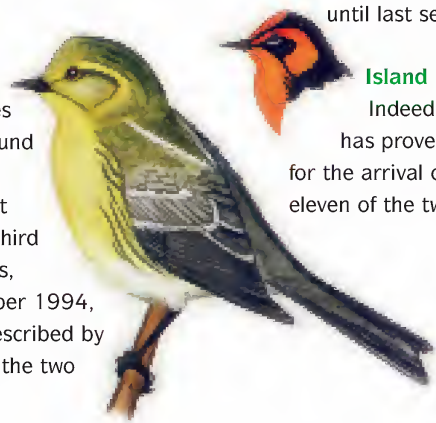
fortunate observers. Birdwatchers who had gathered to search for a yellow-browed warbler reported nearby sadly missed out.

Following the 19th century yellow-billed cuckoos, it was not until 1957 that the next North American land bird was recorded in Wales. Reg Arthur, then in his second season as warden, noted in the Bardsey Report for that year: "For several days in September we had been following the weather situation closely. A succession of depressions and strong westerly winds made an Atlantic crossing of North American birds seem possible."

How right he was, as on the 11th an unusual bird was caught in the Lane Heligoland trap. On examination this proved to be a summer tanager, the first time this bird from southern and central USA, which winters from Mexico to Amazonian Brazil, had been recorded this side of the Atlantic. It remained on Bardsey, increasing its weight by half, until last seen on its favourite perch on the 25th.

Island records

Indeed, across the decades since, Bardsey has proved to be the premier location in Wales for the arrival of American land birds. No fewer than eleven of the twenty-three species recorded have



Blackburnian warbler *Setophaga fusca*. This painting by Peter Fullagar was done from the Saunders' Field Notes, with the addition of a breeding season inset.

Richard Smith

1989: Baltimore oriole *Icterus galbula* makes an appearance on a birdfeeder in Roch, Pembs

occurred on the island, eight of which have not been recorded elsewhere in Wales, while the yellow warbler at the end of August 1964 shares with the summer tanager the distinction of being the first for the Western Palearctic.

American land birds have not been so frequent on the Pembrokeshire islands, though with the re-opening of the Bird Observatory on Skokholm we might expect more sightings. The autumn of 1967 proved quite remarkable for the island, with a rose-breasted grosbeak on 5 October, a Baltimore oriole from 5 to 10 October, and a red-eyed vireo on 14 October, while a Swainson's thrush, the first for Great Britain, was present from 14 to19 October. Since then there has been only one record, a bobolink for two days in October 1999.

In addition to the Blackburnian warbler, Skomer has been the landfall for the only black and white warbler to have reached Wales, one having been seen on 10 September 1980. The only other North American land birds for the island are a rose-breasted grosbeak from 29 September to 11 October 1988 and a bobolink 8 to 11 October 2010.

A yellow-rumped warbler on Ramsey from 31 October to 4 November 1994 probably reached Pembrokeshire on the same weather system as the Porthclais yellow-billed cuckoo already mentioned. Some of those who missed the cuckoo did manage to cross to Ramsey for the warbler, as indeed did many others. Not everyone was successful; a birdwatcher who had travelled from Germany missed it on two days (Woodhead and Bullock 1994). An indigo bunting on the island between the 17 and 26 October two years later was the first recorded in Great Britain.

Inland sightings

Although most American land birds recorded in Wales have been on the small western islands, there have been a number of other significant sightings. A grey catbird at South Stack on 4 October 2001 was the first for Great Britain (Croft 2004), while a red-eyed vireo there on the same day was the sixth Welsh record. Other mainland records include a common nighthawk seen briefly and later found dead in Ceredigion at Mwnt in October 1999; and a chimney swift on Anglesey at Penmon on 2 November 2005. Most trans-Atlantic vagrants occur in the autumn, so what was a brown-headed cowbird doing on two days in July 2009 in an Angle, Pembrokeshire garden? This was the first for Wales and the fifth for Great Britain.

There have been two records from further east in Wales. A bobolink, the second for Wales, was discovered at Eglwys Nunydd Reservoir Glamorgan on 20 September 2010. Most striking of all was the common yellowthroat (another warbler), presumably an individual which had arrived the previous autumn, discovered at Rhiwderin, Gwent on 10 February. It remained here until 31 March 2012. This was the second for Wales, the first being on Bardsey on 27 September 1996, and only the tenth for Great Britain.

One other long-staying vagrant from across the North Atlantic deserves a mention. Early in 1989, Jack Donovan, the Bird Recorder for Pembrokeshire, was telephoned by a householder in Roch who reported a strange bird regularly coming to his feeders. Recognising it from the description as a Baltimore oriole, Jack said he would come straight-

Domonic Sherony WC-SA-2.0-Generic

Bill Condry

A Summer tanager *Piranga rubra* in its native California.
Inset: the visitor which featured on the cover of the Bardsey Report 1957.

away, only to be told, "No, it only appears from about 2pm onwards." Armed with this information he duly presented himself and within a few minutes the bird, the third recorded in Wales, appeared.

Not only did it remain in Roch until 23 April, it spent more and more time at the feeders in the garden. The garden was conveniently skirted by a public footpath which meant that the news of the occurrence could be spread. As a result not only local bird watchers but many from far and wide arrived to watch the bird. Just over £1,000 was collected, funds which enabled the Wildlife Trust to construct a hide at its Marloes Mere Nature Reserve, appropriately known as the Oriole Hide.

Vigilance, particularly during stormy westerly weather systems in the autumn, will surely reap rewards with more North American vagrants being found in Wales. Some will be those mentioned above but new species can be expected. One author has listed no fewer than 73 candidate species for successful trans-Atlantic crossings (Robbins 1980). In the years since, a number have indeed been recorded, and so have several others not even on his list. Just part of the mystery, excitement and at times frustration of North American land birds in Wales.

David Saunders *was warden of Skomer Island from 1960 until 1966, later organiser of Operation Seafarer the first national seabird census, and subsequently Director of the Wildlife Trust West Wales.*

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Peter Howlett

Yellow-rumped warbler *Setophaga coronata*

Climate and a changing coastline

Fore-dunes at Whiteford Burrows.

Last winter's storms brought into sharp relief the power of the sea to re-shape our coastline, a power which will be more and more evident as sea levels rise. The National Trust, with responsibility for so much of Wales's coastline, has been exploring the range of options from hard coastal defence to 'no active intervention', as SARAH MELLOR and RICHARD NEALE explain.

It is ten years since the National Trust completed a comprehensive risk assessment of the 157 miles of Welsh coast in its care. The survey gave us a much deeper understanding of the impacts, both positive and negative, of climate change and sea level rise. The findings then led to the publication of the seminal report, *Shifting Shores*, which set out the principles which now guide our response to the challenges of coastal change. Most importantly, it challenged our natural instinct for defence at all costs and advocated working with, and adapting to, natural processes.

The storms that battered the Welsh coastline last winter were undoubtedly the result of an unlucky coincidence of events. A series of depressions in the Atlantic created a 'storm factory' unleashing storm after storm on our coastline. It was almost inevitable that one of these storms would coincide with one of the predicted exceptional astronomical high tides and, in January, that's just what happened. The timing was faultless.

©National Trust Images/David Noton

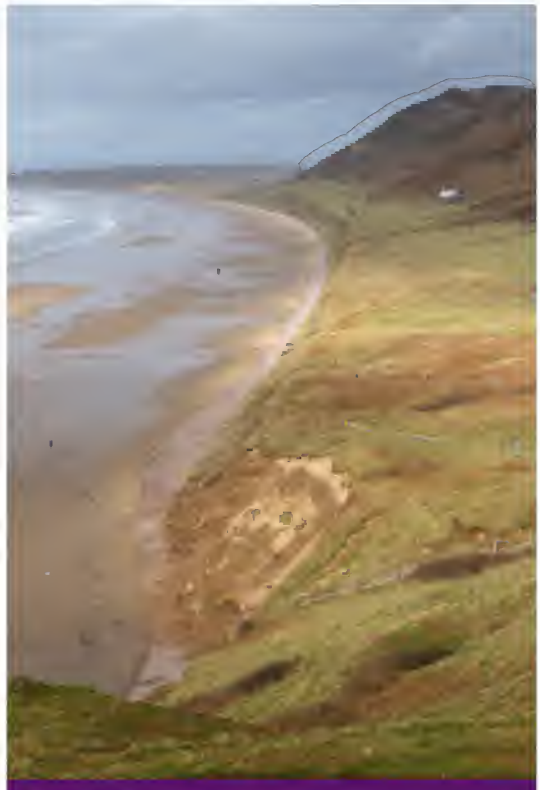
It is testimony to our adherence to the principles of adaptation – including the avoidance of hard infrastructure in the risk zone – that we, as owners of over 11% of the Welsh coast, came off quite lightly as far as structural damage is concerned. We did however have to cope with dozens of eroded paths, dislodged bridges and mountains of seaborne jetsam which cost us tens of thousands of pounds to deal with, not to mention the thousands of hours of staff and volunteer time involved. But these costs are nothing compared to the £11.4m that Natural Resources Wales (NRW) estimated was the cost of storm damage to infrastructure along the entire Welsh coast. The Wales Coastal Path alone suffered significant damage at over 70 locations with repair costs estimated at £340,000.

Many of the impacts of the storms felt at our properties were not unexpected, but their timing was. In some places, we saw changes that we weren't expecting for another 50 years or more. One storm caused a near breach in the shingle ridge at Cemlyn on Anglesey, and half of the car park at Abereiddi in Pembrokeshire disappeared overnight. Perhaps we'll not see a winter like this again for 20 years or more, or maybe this is the start of a series of more stormy winters which will result in accelerated change along our coastline. Whichever way you choose to view it, no-one can deny that in January this year Wales was given a preview of the challenges that we and future generations will have to face on our coastline. The haunting images of long-lost forests uncovered on beaches at Borth and in Pembrokeshire were an evocative reminder that the boundary between the sea and the land is not as fixed as we think it is.

Cwm Ivy Marsh

One of the most radical ways of working with natural processes is to allow large scale coastal re-alignment and let the sea in. At Cwm Ivy Marsh on Gower, we are working in partnership with NRW to relinquish to the Lougher Estuary a piece of freshwater marsh, maintained since medieval times by a seawall and tidal sluice. The cost of maintenance of these has already reached the point where 'holding the line' is not an option. Sometime in the next year, the tide will be allowed to fill the 40-hectare inlet, and the process of recreating saltmarsh will begin. For a time Burrows Cottage, our holiday cottage along the edge of the present day freshwater marsh, will provide visitors with a front row seat to view the newly created saltmarsh. But, as sea levels rise, it is expected that the tide will make the cottage uninhabitable, resulting in a much more natural and dynamic landscape than the one we see today.

Adapting to coastal change doesn't always mean rapid retreat, such as at Cwm Ivy. We have to think about a wide range of options that lie between



Storm-damaged cliff at Rhossili Bay, Gower

©National Trust Images/John Miller

(c) National Trust Images/Joe Cornish

Esgair Gemlyn shingle ridge is an important geomorphological feature which threatens to engulf the nationally-important tern colony in time.

holding the line and 'no active intervention'. A policy of 'no active intervention' along a piece of coastline will rarely mean doing nothing at all. There may be many small actions we can take to minimise the agonising human and financial costs, whilst making the most of the environmental opportunities that arise. It's critical that we have an understanding of the natural processes of change, and that we discuss this with our stakeholders. The more involvement there is with any tenants, neighbours and residents affected, the better the outcome will be.

Cemlyn Tern Colony

Cemlyn Bay is situated on the north coast of Anglesey, a dramatic half-moon shaped bay, with a lagoon separated from the sea by Esgair Gemlyn, a naturally created shingle ridge. The lagoon is entirely man-made, created from saltmarsh by the eccentric Captain Vivian Hewitt specifically to indulge his love of birds. It is difficult to fault his vision, as the lagoon now boasts common and Arctic terns and has also the largest nesting population of Sandwich terns in the UK. The North Wales Wildlife Trust, which manages the site for the National Trust, welcomes thousands of visitors every year to witness this noisy spectacle. The brackish conditions are also home to a range of specialist plants and invertebrates, and it is considered to be one of the finest saline lagoons in Wales.

But nature is set to spoil the party. The mighty Esgair Gemlyn, the ever changing ridge – home to plants which have mastered the art of living on shifting stones, such as yellow horned-poppy and the rare sea kale – is inching its way inland year-on-year and will eventually swallow up the lagoon. As sea levels continue to rise, it is expected that the sea will break through to create an island from part of a nearby farm. In short, it would appear that over the longer term (probably over a century) the terns have no future here.

The experience of this winter has framed the dilemma nicely. In January a near breach of the shingle ridge occurred just opposite the island on which the terns breed, sparking fears of an inundation during the coming breeding season.

View towards Whiteford Burrows National Nature Reserve and Cwm Ivy Marsh, Gower.

©National Trust Images/David Noton

Luckily, this was followed by a spring and summer which saw a record breeding year for terns at Cemlyn. Discussions around how we might deal with coastal change at Cemlyn are on-going, but it is fair to say we thought we had a bit more time to chew it over. Events this year have lent a little more urgency to discussions. This spring, meeting with partners such as the North Wales Wildlife Trust, NRW, RSPB and Anglesey Council, we spent some time thinking about the coming changes and how we might respond. Part of our preferred management strategy is to free the ridge as far as possible from structures which prevent natural movement of the shingle and limit tidal exchange with the lagoon. This will result in a naturally functioning ridge, which will be more resilient to storms.

The terns provide a slightly more knotty problem. While we may agree that limited interventions such as creating new, more resilient islands or short-term emergency repairs to the shingle ridge may be justified in the shorter term, we are very aware that these are only buying time, and we must do it in the context of future change. For all species of tern it is important that we look at adaptation at a landscape level, and as part of this we have started to consider old records of breeding terns around Anglesey and to gather information on breeding sites within the Irish Sea area. Given that many other colonies are in similar low-lying coastal sites likely to face the same issues from coastal change, it seems that the landscape-scale approach to providing opportunities for terns to respond to change is the only reasonable way forward.

Chris Gomersall (rspb-images.com)

Sandwich terns *Sterna sandvicensis* môr-wenoliaid pigddu

©National Trust Images/Robert Morris

Bosherston Lily Pond towards Broadhaven beach and Stackpole, Pembs. How long can this remain as a freshwater habitat?

Options at Bosherston

Discussions like those at Cemlyn are going on at many sites around our coast. At Bosherston Lakes in Pembrokeshire – another example of an ambitious, man-made landscape turned natural gem – we recently convened a steering group to work on a vision for the future of the lakes. Here we know that one day in about 30 to 50 years' time the tide will rise, perhaps as part of a storm surge, and top the dam, inundating the freshwater lakes with salt water. Ultimately, the charophytes for which this lake is so highly valued will no longer be able to survive in the central and western arms of the lake.

We are spending time exploring the options for sustainable future management. Should we make use of water-control structures to mitigate some of the potential impacts and protect the freshwater habitat for longer? Can we work with farmers in the catchment to reduce the sediment and nutrient loading in the eastern arm of the lakes, therefore creating a freshwater refuge for charophytes? How far do we go, and how much money do we spend in managing this freshwater reserve? These are the questions that we and our partners face in negotiating the challenges of a changing coastline.

Early pioneers

In 2015 we celebrate the 50th anniversary of the Neptune Coastline Campaign, originally named Enterprise Neptune. The appeal was a result of an increasing awareness from the 1930s onwards of the damage that was being done to our coastline through unrestricted, inappropriate development. The first piece of coast to be purchased with donations into the appeal was Whiteford Burrows, adjacent to the Cwm Ivy Marsh mentioned above. Since then, about a hundred miles of Welsh coast has been saved, thanks to donations into the Neptune fund.

The early advocates of a coastline appeal, such as the historian George Trevelyan, were mainly motivated by concerns about unsightly tourism developments, such as car parks, bungalows, chalets and caravan sites. We have to assume that the threats of climate-change and the resulting sea-level rise didn't feature in their fears for our coast. However, we feel certain that if they were to return they would be adamant in their support for our Shifting Shores principles, with their benefits – both to society and nature – of a more natural, dynamic coastline.

__Sarah Mellor__ worked for the National Trust as its Special Sites Project Officer. She now works for Pembrokeshire Coast National Park Authority as its ecologist. __Richard Neale__ has worked with the National Trust for 35 years in a variety of country-side roles. He is currently leading a project to promote the Trust's coastal properties in Wales.

Yr hinsawdd ac arfordir sy'n newid

Arweiniodd y stormydd a gawsom y llynedd at oddeutu £11.4m o ddifrod i seilwaith Arfordir Cymru. Yr Ymddiriedolaeth Genedlaethol sy'n gyfrifol am 157 milltir o'r arfordir hwn (11%) ac mae'n wynebu'r heriau hyn trwy roi dull newydd a gwreiddiol ar waith – sef gweithio gyda phrosesau naturiol yn hytrach nag amddiffyn yr arfordir costied a gostio. Mae ardaloedd sydd mewn perygl yn cynnwys Llynnoedd Bosherston (Sir Benfro), lle disgwylir i ddŵr hallt dorri trwy'r argae a gorlifo'r llynnoedd dŵr croyw; lagŵn Cemlyn (Ynys Môn), lle mae'r marian sy'n amddiffyn nythfeydd o fôr-wenoliaid mewn perygl gan fod lefel y môr yn codi; a Chors Cwm Ivy, lle mae cors dŵr croyw eisoes wedi dechrau troi'n gors dŵr hallt.

Dewi Edwards

Cynffon Sidan - "Cennad y Chwyldro?"
Waxwing - "Harbinger of the Revolution?"

Y Tywyddiadur

yn cofnodi tywydd a ffenoleg yng Nghymru (rhan 2)

Yn Rhan 1 o'r gyfres hon (Natur Cymru 50) amlinellwyd y mathau o ddata dyddiadurol Cymraeg a geir yn Y Tywyddiadur, sy'n rhan o wefan Llên Natur. Yma, mae DUNCAN BROWN a TWM ELIAS yn cyflwyno rhai o'r pynciau a'r astudiaethau achos penodol a gododd o ymchwilio bron 90,000 o gofnodion Y Tywyddiadur, sy'n dangos gwerth y dystiolaeth Gymraeg a Chymreig fel adnodd amgylcheddol mewn cyd-destun ehangach.

Gwlad arall yw'r gorffennol, maent yn gwneud pethau'n wahanol yno.

Mae tystiolaeth amgylcheddol Cymraeg yn bodoli ers o leiaf pum canrif. Arferai'r beirdd noddedig gofnodi sylwadau am eu hamgylchedd hyd y 16G trwy faledi, marwnadau a barddoniaeth mawl, er mai achlysurol oedd cofnodion o werth amgylcheddol, a phrinnach fyth oedd cofnodion â lleoliad a dyddiad manwl lled ddibynadwy.

Prin fu cofnodi yn y Gymraeg am y byd o gwmpas rhwng hynny a'r 19G. Ond roedd bri ar gofnodi amgylchedd Cymru drwy'r Saesneg gan fonedd addysgedig megis Edward Llwyd (17G) a Thomas Pennant (18G), tra byddai Morrisiaid Môn (18G) yn cofnodi drwy lythyron yn y ddwy iaith.

Yn Rhan 1 cyfeiriwyd at lythrennedd cynyddol y werin Gymraeg dan ddylanwad ysgolion teithiol Griffith Jones Llanddowror ar ddiwedd y 18G ac yna Ysgolion Sul Thomas Charles drwy'r 19G. Yn nyddiaduron y

19G gwelwn falchder a brwdfrydedd nifer o'r werin Gymreig at
ysgrifennu yn eu mamiaith, e.e. dyddiadur William Jones (17 oed), Penbrynmawr, Penygroes[1]:

18 Ionawr 1887: B*um yn trio redig tyndir yn Cae Main wel nid oes dim neillduol ar fy meddwl i heno, ond rhoid rwbath i lawr i drio dysgu ysgrifenu mae yn bwrw gwlaw mawr yn awr wel mae yn dywydd ...wel dwn i ddim beth fydd hi fory nid wyf yn broffwyd.*

Gall cofnodion fel hyn o dywydd dyddiol a gwaith tymhorol (ffenolegol) roi gwybodaeth werthfawr am batrymau tywydd y gorffennol a bywydau pobl gyffredin.

Y Chwyldro Ffrengig: ffenomenon amgylcheddol?

Gall digwyddiadau naturiol, os yn ddigon cryf i ddylanwadu ar yr economi ac ar fywydau pobl gyffredin, gael effaith hefyd ar wleidyddiaeth a hyd yn oed ar gwrs hanes. Bryd hynny bydd perthynas amlwg rhwng y naill a'r llall, ond yn amlach mae'r berthynas yn llai amlwg ac yn dueddol o gael ei hanwybyddu gan haneswyr traddodiadol. Un o ddibenion Prosiect Llên Natur, a'r Tywyddiadur yn benodol, yw ceisio cywiro'r dueddiad hon.

Rhwng Mehefin 6ed1783 a Chwefror 7fed 1784 ffrwydrodd llosgfynydd Laki, Gwlad yr Iâ a gwasgaru tunelli o ludw a nwyon sylffyraidd dros rannau helaeth o hemisffer y gogledd, yn cynnwys gorllewin Ewrop. Ystumiwyd y tywydd gan y llwch, gan droi dydd yn nos parhaol a pheri i'r cnydau fethu ac achosi newyn mawr. Roedd hyn yn un o'r ffactorau a sbardunodd y Chwyldro Ffrengig yn 1789. Cafwyd adroddiadau manwl yn nyddiadur Gilbert White o Hampshire, ond beth oedd effeithiau Laki yng Nghymru? Yn ôl John Grattan[2]:

Laki and Wales is terra incognita at the moment. There is reference to a mysterious deadly fever raging in Carmarthenshire at the time the deaths were peaking elsewhere in the UK, but beyond that little is known. The poor weather of the three following years ought to have made life hard for a lot of farmers in Wales. As for the acid impacts ? nothing known as yet ? but no one has really looked – YET.

Yn y Tywyddiadur cofnodir cerdd a gyhoeddwyd ar Chwefror 20fed 1784[3], flwyddyn wedi ffrwydriad Laki, yn ymbil ar Dduw am ysbaid rhag caledi'r gaeaf a ddilynodd y ffrwydriad:

Dy gerydd a gawsom
Bu Eira'n drwch fel Barn drom
Dyrnod am bechod arnom
Attal y dial o Dad byw'r oesoedd

A'th brysur ymweliad
Un Duw gwir yn dy gariad
Dyro'n glir dir ein g[w]lad.

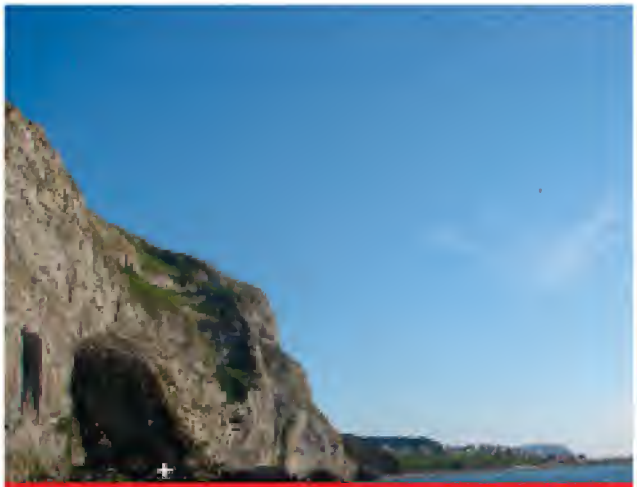
Wellcome Images CC-2.0 Generic

Ar Dachwedd 29ain 1785, ysgrifennodd un o Foneddigesau enwog Llangollen: *Powell at work in the New garden - digging among the Strawberries and raspberries and planting out 140 little rose trees which We have raised from Berries of Our Garden saved in the year 1783....*[4]

Dyma'r dystiolaeth gyntaf sydd gennym o effaith debygol Laki ar Gymru, a hynny yng ngogledd Cymru hefyd, sy'n syndod o ystyried mai o'r de y daeth effeithiau Laki i Loegr.

Roedd cyfnod y 1780au yn eithriadol o safbwynt y tywydd. Tybed a ddylanwadodd sychder 1788 a gaeaf enbyd 1788-89 ar y terfysgoedd yn Ffrainc y flwyddyn ganlynol? Achosodd y gaeaf hwn galedi ar draws Ewrop, a llwyddwyd cynnal Ffair Rhew ar y Tafwys am y tro cyntaf ers hanner canrif. Dyma'r flwyddyn gyntaf a gofnodwyd fel "Blwyddyn y Gynffon Sidan" ym Mhrydain - mae'n debyg oherwydd y gaeaf eithafol yn Scandinafia[5] .

Esgorodd sychder mawr haf 1793 ar 'Gynhaeaf Coll' - ergyd arall i werin Ffrainc yn eu trybini. Yn ôl adroddiad ganrif yn ddiweddarach, teimlwyd y sychder hwn yng Nghymru:


Gareth Pritchar

Clogwyn Trwyn y Fuwch, Llandudno, safle naturiol honedig gwenoliaid y bondo (y groes yn nodi cofeb Hubert Stone 1883-97)
Little Orme cliff, Llandudno, the alleged natural site of house martins (the cross denotes the memorial to Hubert Stone, 1883-97)

Richard Bowdler Sharpe

Ai gwir yw mai clogwyn Malham Cove, swydd Efrog, yw'r unig fan ym Mhrydain lle mae'r aderyn hwn yn nythu ar glogwyn naturiol? Dyna holodd Gareth Pritchard wrth anfon y llun uchod o Drwyn y Fuwch: "Pa mor ddibynadwy yw ffeithiau Harry Thomas!" Llond lle o filidowcars - cannoedd ohonyn nhw welir yn yr ardal yma. 'Does yna fawr ddim o sôn am wenoliaid y bondo chwaith yn llyfryn Marc Berw Hughes a Robin Sandham, A Checklist of the Birds of the Great Orme and Little Orme. Ond roedd Harry Thomas yn naturiaethwr da. Gyda'r fath fwlch amser rhaid cymryd pob sylw o ddifri.

SYCHDER MAWR. *Canrif yn ôl, 1793, cymerodd sychder mawr le, tebyg i'r un yr ydym yn ei gael yn bresenol. Cafwyd gwlaw trwm am fisoedd cyntaf y flwyddyn, ond o Ebrill hyd Medi parhaodd yr awyrgylch yn ddi-gwmwl. Ni chafwyd ond ychydig ddafnau o wlaw yn ystod pum mis a haner. Yr oedd misoedd Mai a Mehefin yn oer neillduol, ond yn Gorphenaf trodd y gwynt a chafwyd cynesrwydd anarferol. Yr oedd pob beth yn ngwyneb yr haul yn annyoddefol boeth, tra y llewygai gwyr a gwragedd yn aml gan y gwres. O'r diwedd, ar y 15fed o Medi, cafwyd gwlaw trwm, ac adnewyddodd y ddaear.*

Ble roedd gwenoliaid y bondo'n nythu cyn bod talcenni tai?

Yn aml, gall pynciau diddorol ddeillio o sylwadau digon diniwed mewn dyddiaduron, fel yr enghraifft yma gan Harry Thomas, Llandudno:

8 Mehefin 1916: *Misty rain which had fallen during the night soon clears. Walk with Doll & George to the Cross at the foot of Little Orme cliff. Count 20 House Martins [nythod mae'n rhaid] against the cliff.*

Ydy gwenoliaid y bondo yn dal i nythu ar Drwyn y Fuwch? Yn y cofnod uchod cyfeiria Harry Thomas at y 'Cross', sef cofeb i'r llanc Hubert Stone a ddisgynnodd i'w farwolaeth tra'n casglu wyau adar ar Awst 30ain 1897. Mae'r gofeb yno hyd heddiw.

Gwarchod gwernydd Cwm Eidda

Mae Gwernydd Tŷ Uchaf, Padog, Pentrefoelas, neu 'Y

Duncan Brown

Y belen aur (gronnell), sy'n niferus yng ngwernydd Tŷ Uchaf, Padog.
Globeflower, plentiful in the damp meadows at Tŷ Uchaf, Padog.

Duncan Brown

John Jones Tŷ Uchaf, Padog gydag offer lladd mawn a ddefnyddiwyd ddiwethaf ar y fferm yn y 1960au
John Jones Tŷ Uchaf, Padog with peat-cutting tools that were used for the last time on the farm in the 1960s

Wernydd' fel y'u gelwir gan y teulu sy'n eu ffermio, yn Safle o Ddiddordeb Gwyddonol Arbennig oherwydd eu cymunedau prin o blanhigion glaswelltir lled-naturiol. Yn nyddiadur y diweddar Mr. D.O Jones ceir cofnodion am reolaeth draddodiadol y caeau o 1939 tan o leiaf 1954, sy'n taflu goleuni ar amrywiaeth fiolegol y safle heddiw.

20 Mai 1939: *Lladd mawn yn y Wernydd*
17 Hydref 1940: *codi bwlch yn wal y Wernydd*
12 Rhagfyr 1940: *Gorffen ffosio yn y Wernydd*
16 Awst 1941: *Pladurio yn y Wernydd*
9 Medi 1941: T*anu ystodiau gwair yn y Wernydd hefo picfforch*
26 Chwefror 1942: *Llosgi hen ffegiach yn y Wernydd*
17 Ebrill 1945: *Mesur ffosydd yn y ffridd ac yn y Wernydd,..... i gael grant ffosydd gan y llywodraeth*
Ebrill 1955: *Aredig sofl gwaelod Wern Ganol*

Bydd astudiaeth Lari Parc o gofnodion D.O Jones ar wefan Llên Natur maes o law.

Trychineb Lynmouth 15 Awst 1953

Mae'r Tywyddiadur yn fodd i ganfod straeon na fyddent fel arall yn gweld golau dydd. Lladdwyd 32 o bobl pan dorrodd yr afon Lyn (Exmoor, Dyfnaint) ei glannau ar Awst 15fed 1953. Roedd y Gymraes Rwth Tomos yn dyst fel plentyn i'r digwyddiad:

Mae gen i cof plentyn 4 oed am wersylla ger Lynmouth efo grwp o ddarlithwyr (gan gynnwys fy nhad) a rhai myfyrwyr. Roedd y babell ble y cysgais gyda fy 2 brawd wrth ymyl yr afon. Cawsom ein deffro gan law. Bu fy mrawd mawr 5 oed a minnau yn dadlau os dylen ni fynd i ddweud [wrth rhywun] fod dwr yn dod i fewn i'r babell (wedi cael gorchymun gan mam i beidio â gadael ein gwlau). Daeth 2 fyfyriwr a rhoi ni'n 3 ar un gwely gan gario ni i fyny'r rhiw tua'r prif babell. Hanner ffordd yno ddaru nhw weiddi am help a gwelsom ni ein pabell yn diflannu i lawr yr afon. Gwelais fy nhad yn rhedeg tuag atom. Bu ofn arnaf y buasai yn ddig am golli'r babell ond cododd fi yn ei freichiau â'm cario tua'r prif pabell. Roedd y prif pabell yn llawn o bobl gyda fy nhad yn siarad â hwy. Dywedodd ei bod ef yn mynd i lawr i'r pentref i ddweud i bobl am y glaw. Cofiaf y geiriau "I am only taking volunteers with me" ond methais a deall pam oedd ei lais mor ddifrifol.

Y peth nesaf rwy'n cofio oedd deffro a gweld fod y babell yn wag heblaw am mam a'm mrodyr. Roedd hi yn brysur wrth y bwrdd a gofynnais beth oedd hi'n gwneud. Atebodd ei bod hi'n gwneud brechdannau a'r gyfer pawb pan daethon nhw yn ôl ond y dylwn i fynd yn ôl i gysgu gan ei bod hi ynghanol y nos. Pendronais pam y buasai pobl yn eisiau bwyd yng nghanol y nos, cyn cysgu eto.

Y bore canlynol roedd y dynion yn palu ffosydd o gwmpas y pebyll i gyfeirio y dwr glaw oddiwrthynt. Cafodd fy mrodyr a finnau lawer o hwyl yn neidio drosdynt gyda neb yn gwylltio gyda ni am fod dan draed ac hyd yn oed pan syrthiodd fy mrawd bach (bron yn 3 oed) i un o'r ffosydd a chael ei dynnu

allan yn wlyb ac yn fwdlyd nid oedd neb yn grac gyda ni.

Nes ymlaen cyrhaeddodd milwyr. Cafodd fy mrodyr a finnau rhasys 'piggy-back' ar gefn milwyr ar draws y caeau ble roedd dŵr yn gorwedd gan wneud y tir yn rhy fwdlyd i Landrover ddod atom. Cawsom lawer o hwyl a'r peth mwyaf doniol oedd gweld un o'r milwyr yn cario Mam ar draws y cae. Wedyn deallasom fod mam a ninnau yn mynd adref ar y trên heb fy nhad a oedd am aros i gynorthwyo yn y pentref, Roeddem yn siomedig iawn gan fod y gwyliau wedi bod yn gymaint o hwyl. Ni sylweddolais am flynyddoedd fod trychineb wedi digwydd.

Dyma brofiadau dyddiadurwyr Cymreig o'r diwrnod hwn, a thrannoeth:
15fed Awst: Reit braf a sych. Ond erbyn 16eg Awst roedd wedi newid i: *Gwlaw a hegar* (Dyddiadur John Owen Jones, Crowrach, Bwlchtocyn, Llŷn)

15fed Awst (Padog): *Gwerthu 25 o wyn gwrryw [sic] yn sel Pentrefoelas am 57/= yr un. Tori gwair yn y caeau gwaelod. Mam a Beti yn bydylu dwy res yn Gefnen Wen. Gwres yn y bore a glaw gyda'r nos.* (Dyddiadur D.O. Jones – *'Yn y gwair'* oedd D.O.J. ar y 16eg, mae'n rhaid ei bod hi'n braf yno)

Cyrhaeddodd y glaw ogledd Cymru y diwrnod wedyn, yn ôl adroddiad y Swyddfa Dywydd (7), a dyma a ysgrifennwyd gan y dyddiadurwr A.Ll.J. o Gerrig Gweunydd, Harlech:

15fed Awst: Sunny up to 1.30pm, scattered clouds by midday from NE..heavy thundery shower 4pm..rain 10.30pm (Floods in Lynmouth evening, 9 inches fell on Exmoor in 24 hours).

Mae'r astudiaethau uchod yn tynnu ar brofiadau llygad-dystion. Yn Rhan 3 o'r gyfres hon rhown sylw i ddigwyddiadau tywydd o safbwynt meteorolegol, gan ddangos sut y gellir dehongli gwybodaeth o ddyddiaduron cefn gwlad mewn modd syfrdanol o wyddonol.

*Bu **Duncan Brown** yn warden gwarchodfeydd natur gyda Cyngor Cefn Gwlad Cymru a chyn hynny gyda'r Cyngor Gwarchod Natur. Ers ymddeol bu'n canolbwyntio ar ffyrdd o weld y byd naturiol trwy ffynonellau lleol a thrwy bersbectif hanesyddol. Mae'n olygydd Prosiect Llên Natur ar ran Cymdeithas Edward Llwyd.*

*Mae **Twm Elias** yn gysylltiedig â nifer o brosiectau amgylcheddol / cymunedol, gan gynnwys Cynefin a Chymuned a Llên Natur. Arferai fod yn ddarlithydd ac yn drefnydd cyrsiau ym Mhlas Tan y Bwlch, Canolfan Astudio Parc Cenedlaethol Eryri.*

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Welsh weather records

Y Tywyddiadur is part of the Llên Natur project which records and celebrates the relationship between people and the natural environment. Historic records can tell us a great deal about the wildlife, weather and changing landscapes of Wales, and can be linked to political events. In 1783-4 volcanic ash from Iceland altered weather patterns over Europe, leading to crop failures and famine – a contributing factor in the French Revolution of 1789. A Welsh poem from 1784 pleads with God for respite from the severe winters. House martins these days invariably nest on houses but a 1916 diary records them on the cliffs at the Little Orme, Llandudno. D.O. Jones's diary 1939-54 describes the traditional management of fields which explains their biodiversity today. Ruth Thomas, visiting Exmoor as a child, recalls the floods there which killed 32 people in 1953, while on the same day a Harlech diarist A.Ll.J. writes: *rain 10.30pm (Floods in Lynmouth evening, 9 inches fell on Exmoor in 24 hours).*

A full translation of this article is available on request or via our website **www.naturcymru.org.uk**

All photos - Keith Jones

Renewable energy and the natural environment

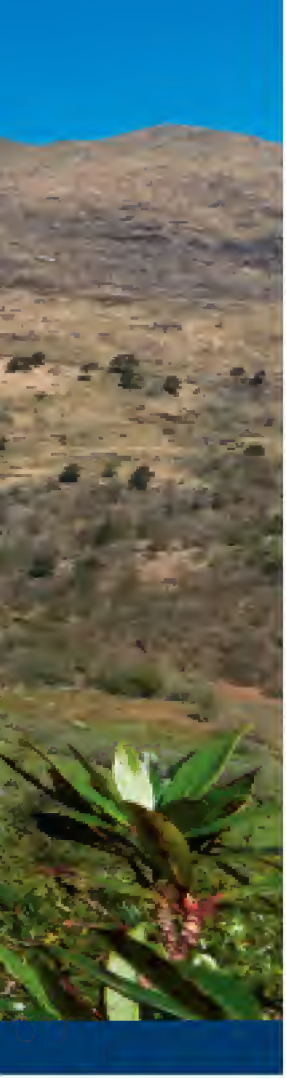
a National Trust perspective

Hafod y Llan, site of the National Trust's single largest renewable energy project.

The National Trust has been trailblazing the generation of renewable energy on its estate, but only after cutting back on its energy use, and not at the expense of biodiversity, as KEITH JONES explains.

Renewable energy and nature conservation have often been seen as being at opposite ends of the environmental spectrum: you can promote one or the other, but not both together. Indeed, biodiversity may lose out in the face of renewable energy developments. Yet carbon emissions, resource depletion, waste and an insatiable thirst for energy present an unprecedented threat to all that we hold dear in terms of biodiversity richness, natural services or simply existing. Change has always happened and is the nature of conservation but humans are now driving rapid change at a global scale. The National Trust in Wales has been focusing on renewable energy for the last three years. We hope also to demonstrate that we don't have to do everything everywhere and that nature and renewable energy can both be winners.

In 2009 the National Trust stated that it would reduce its energy use by 20% and generate 50% of the remaining amount from renewable sources on its estate, by harvesting sustainable energy but also working



with, rather than against, the natural environment. The first priority was to reduce our energy use before considering energy generation. Over the first two years we, as an organization, achieved a 40% cut in energy use across Wales through a combination of management, technology and culture. But we still need to generate energy to meet an energy needs gap. Interestingly the National Trust in Wales has made a commitment to generate more renewable energy than we consume... high ambitions! These are some examples of how we are delivering multiple sustainability benefits without compromising the natural environment.

Photovoltaic Solar (PV) panels and wild flower meadows

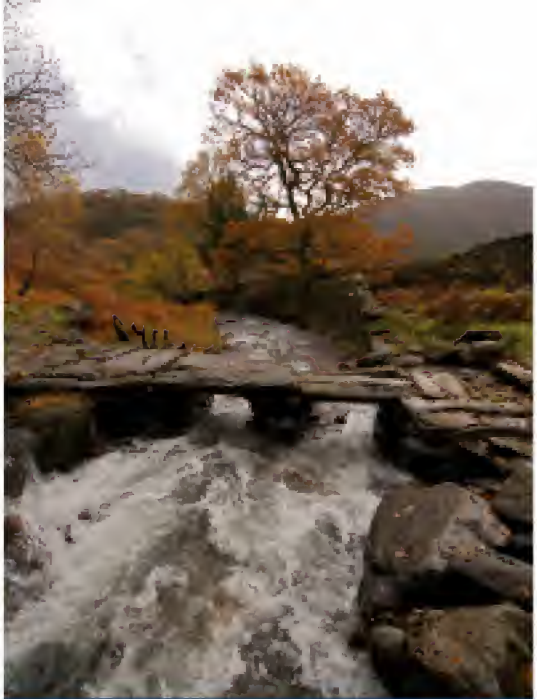
Plas Newydd is home to a 'coronation' meadow being used to spread wildflower seed to new sites. It started with three orchids on an old sports field, and now has an estimated 150,000. But we are also growing renewable energy in this flowery paradise. A quarter of the electricity needs of Plas Newydd is now harvested from the half-acre or so of PV panels which have been installed. Specifying, installing and managing the PV system to work within the meadow environment was relatively simple. It has been installed in such a way that it can be simply removed, replaced or improved without impacting on the meadow. So successful has the system been that the solar trade association have it as one of their examples of win–win for biodiversity and renewable energy generation. We have several more of these systems in development. Creating pollination hot spots is now a key aspect of their design. We have shown that it can be done and therefore there are no excuses not to do it.

Photo-voltaic panels in the Coronation meadow, Plas Newydd.

A former grain silo at Dinefwr houses a biomass system running on woodchip.

Biomass heat and woodland management

Getting away from the use of oil at our mansion and visitor sites is a cornerstone of the renewable energy strategy. Impacts on the natural environment during abstraction, carbon emission intensity, and storage and distribution risks are part and parcel of this 'old' form of energy generation. Moving off oil makes environmental and economic sense but simply replacing oil with unsuitable biomass is no better. At Stackpole in Pembrokeshire and the Ysbyty Ifan estate in Snowdonia we produce our own wood chip from UKAS certified woodlands. Generating wood products from these woodlands with the associated economic benefit helps the National Trust to move from softwood rapid growth monocultures over to a much more diverse broad leaf and mixed tree cover. A well planned biomass system should also drive good woodland management with the associated benefits in biodiversity. Simply replacing oil with wood-pellets manufactured half way round the world in the name of carbon reduction we think misses the



Afon y cwm. The new turbine has been operational since July 2014

point in terms of 'sustainability'. With the new series of wood chip boilers being installed across the NT, woodland plans and conservation gain come as part of the package.

Hydro-electricity generation impact

Developing hydro-electric schemes has taken us on an interesting, rapid, learning journey. Hafod y Llan farm on Snowdon now boasts the single largest renewable energy project the National Trust has embarked on to date. The recently completed hydro system now generates enough electricity to light all of the mansions and castles in the NT across Wales. Hafod y Llan was chosen because of the post-industrial nature of the site with its copper mining relics, its proximity to a strong grid system due to the century-old Cwm Dyli hydro-electric scheme, and a supposed sterile river. Toxic mine seepages actually create niche environments for extremophiles, as we found out.

The lichen survey of the site confirmed the presence of *Cryptothele rhodosticta*. Its life cycle is little understood, its range and needs are also not known. With our partners we identified the environmental conditions *Cryptothele rhodosticta* is exposed to and designed an energy system which works outside this range, thus leaving the lichen exposed to the same conditions as before. At Hafod y Llan visitors enjoy the visual amenity of a waterfall; not impacting on this with reduced flows has been a critical consideration. A combination of fixed point photography over six months and stream flow monitoring to confirm how much water is needed to maintain a spectacular 100ft waterfall also had to be factored in. Then and only then could we decided on the size of the hydro system.

Bangor university students contemplating the weir at Cwm Llan

One of the main lessons from the Hafod y Llan experience has been the bespoke nature of each hydro scheme, which can be adapted and reduced in size depending on what the natural environment dictates. But the option not to proceed with a scheme must be given equal consideration and not just be an afterthought.

Technology in the renewable energy sector is advancing at a rate of knots. This is both

increasing the amount of energy which can be generated from the natural environment and reducing impacts. The National Trust is trying to keep up with this new revolution but also to stay grounded enough to say 'not here' for certain approaches.

What next?

Until we find a way of not using energy we will have to generate it; but not at any cost. The National Trust continues to look for new ways of generating a sustainable KW. This year's global interest in the recently completed Plas Newydd Marine Source heat pump is testament to people's thirst for solutions. But this must be couched in the fact that the most sustainable thing to do is not to use the energy in the first place. Plas Newydd reduced its energy use by 40% before we moved into generation. But if we have to generate energy, then we need to ensure that we gain as much as we can.

The 28 foot diameter wheel at Aberdulais, Europe's largest electricity-producing water wheel.

Keith Jones *has been the National Trust's Environmental Advisor for six years. Previously he worked for NT as a countryside manager and head warden, Snowdonia and Llŷn. He received this year's IWA Inspire Wales Environmentalist of the Year Award. His blog can be seen at www.ntenvironmentalwork.net*

Surveying at Ysbyty Ifan near Betws-y-Coed.

Yr Ymddiriedolaeth Genedlaethol ac ynni adnewyddadwy

Bu'r Ymddiriedolaeth Genedlaethol yn datblygu cyfleoedd ynni adnewyddadwy sy'n llwyr ystyried bioamrywiaeth, wrth leihau ei defnydd ei hun o ynni gan 40% mewn cyfnod o ddwy flynedd. Mae ei phaneli haul ffotofoltäig yn cynhyrchu chwarter anghenion ei heiddo ym Mhlas Newydd, a defnyddiwyd y man yn ffynhonnell hadau ar gyfer dolydd llawn blodau gwyllt ion mewn mannau eraill. Mae'r YG wedi newid o olew i sglodion pren o'i hystadau ei hun yn Ystangbwll Elidir yn Sir Benfro ac Ysbyty Ifan yn Eryri, lle mae'i chynllun trydan dŵr mwyaf, yn Hafod y Llan, yn cynhyrchu digon o ynni i oleuo ei holl blasau a chestyll yng Nghymru. Lluniwyd y cynllun hwn gan ystyried cen prin, gan ddangos pwysigrwydd addasu cynlluniau at ofynion yr amgylchedd naturiol. Mae'r YG yn cadw llygad barcud ar dechnoleg ynni adnewyddadwy, sy'n datblygu'n gyflym, ac wedi arloesi â phwmp gwres ffynhonnell forol ym Mhlas Newydd, sydd wedi ennyn diddordeb cyhoeddus enfawr. Mae'n cydnabod, fodd bynnag, mai'r dull mwyaf cynaliadwy yw peidio â defnyddio ynni i ddechrau.

Tony Pickup

Levelling Nature - *motorway madness on the Gwent levels*

In an alarming and dramatic mid-summer statement, the Welsh Government announced its preferred option for the M4 relief road across the Gwent Levels. The route chosen appears to be the most ecologically destructive, most financially expensive, and most time-consuming of all the options on offer. SORREL JONES, Conservation Officer for Gwent Wildlife Trust, comments here on the controversies, difficulties and perceptions that surround Welsh Government's decision.

Between you and me, the Gwent Levels always make me a bit uncomfortable. My own natural habitat lies between the Valleys and the Beacons, and without the embracing shadows of the mountains I feel too exposed and vulnerable. Sometimes all you can see are the hedges of the field you're in, or, if you have the misfortune to be 5ft tall and walking through crops or reeds, absolutely nothing at all. You have no reference to the landscape – you could be anywhere.

And this, I feel is one of the problems of the Levels. It's hard to relate to. The best way to appreciate it is either from an aeroplane, or with a microscope – the big picture or the fine details. You can find the world's smallest flowering plant, or one of Britain's largest diving beetles, but you might have to walk across a few fields, push your way through an overgrown hedge, slide a few metres down a bank, submerge up to your waist in pungent water, and spend a few hours with a pond net to do so. It is an exceptional archaeological site – people have lived there for over 7000 years. There are amazing footprints of Mesolithic children in the

Estuary mud, but they are only accessible for about an hour each day when the tide goes out, and you must be accompanied by an experienced guide.

So, maybe the problem is that the Welsh Government just doesn't get it. Even with all the expertise at their disposal, they can't see the lapwings nesting in the grass, or hear the plop of the water voles, or feel the gentle flow of the reens. It's just a convenient, flat place to put lots of cars.

Unfortunately for them though, it's turning out a lot more inconvenient than it looks. You'd think that having failed to build a road here for the last twenty years they might have figured out there's more to this place than meets the eye, but sadly not.

Firstly, they need to prove there's a need for more roads. Yes, we've all been stuck at the Brynglas tunnels occasionally, but traffic levels in Newport have been falling since 2004[1]. The model used by the Welsh Government to predict traffic growth is generally regarded as outdated and biased towards increased car use, and the consultation failed to take into account developments such as the A465 dualling, variable speed limits, new rail lines and rail electrification, and the proposed South East Wales Metro, all of which could further reduce traffic levels.

Then, there's all this landscape and wildlife in the way. Try building a road across very, very wet fields, and a gigantic bridge across the whole of Newport Docks. Then make sure that it doesn't have a negative impact through pollution, habitat loss and fragmentation. Ensure it blends in with an historic

David Wooton/RSPB

Aerial view of Newport Wetlands and the Levels

Chris Hatch

Magor Marsh: water vole *Arvicola terrestris* llygoden bengron y dŵr

landscape, and, if you can, try to deliver a reduction in greenhouse gas emissions as well. No wonder the cost is well over £1billion and rising.

Big picture? This is a Government which set Sustainable Development as their central organising principle. They are also committed to halting biodiversity decline, preserving ecosystem function and reducing greenhouse gas emissions by 40% by 2020. Society is becoming increasingly aware of environmental issues, and lifestyles are changing accordingly. Technology is allowing us to work from home and meet up remotely so we don't have to travel so much. Public transport is improving (albeit slowly). There is a growing body of evidence for the economic value of the landscape – the products we grow, the potential for recreation and the health benefits this entails, and the unseen processes like water filtering and nutrient cycling. For the Gwent Levels, we estimate this to be over £67m per year for figures that don't even include income from tourism and recreation, or savings on health services[2].

Small details? The inconvenient 'red tape', as constantly bemoaned by politicians: in this case, something called the Strategic Environmental Assessment (SEA) Directive – the requirement that government plans and programmes should be assessed to determine their effects on the environment. It also requires that reasonable alternatives to the plans or programmes should also be identified and assessed. Friends of the Earth

GWT

Gwent Wildlife Trust
Solutia Reserve

Cymru have launched a legal challenge against the Welsh Government, on the grounds that reasonable alternatives, such as improvements to existing routes and public transport improvements, were not fully considered within the SEA process.

Perhaps, on reflection, the Levels make me uncomfortable because the spectre of the relief road has always threatened them. I am uncomfortable with a Government that would be willing to spend vast amounts of money it doesn't even have, on infrastructure that defies its own principles, based on extremely dubious evidence. I am uncomfortable with the fact that my colleagues are working to conserve and enhance and promote the wildlife and landscape of the Levels, when it may all count for nothing. I am uncomfortable with those who, like me, are campaigning so hard to save the Levels, because how can you change the mindset of a government that just doesn't get it?

***Sorrel Jones** is a Conservation Officer at Gwent Wildlife Trust, which is a part of the Campaign Against the Levels Motorway Alliance. To find out how you can support the campaign, see www.savethelevels.org.uk*

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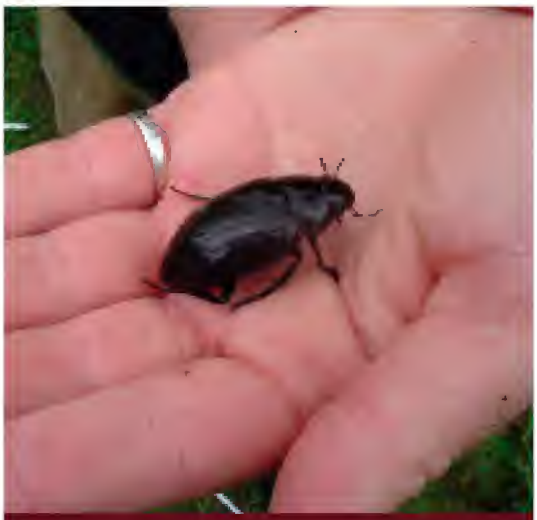


Great silver diving beetle *Hydrophilus piceus*

Courtesy: David Bailey

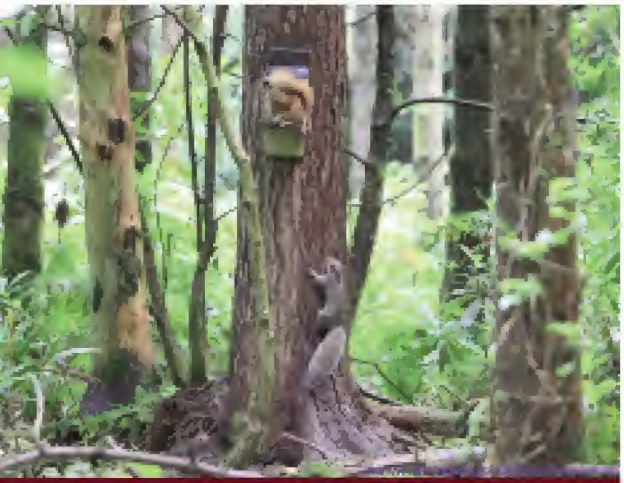
Red squirrel conservation and disease - **Adenovirus in Wales**

Red in a feeder at Plas Newydd on Anglesey

The role of adenovirus in red squirrel mortality is becoming clearer, thanks to recent research. But the picture is a complex one, not least because of the possibility of viral transmission by grey squirrels and woodmice and the discovery that red squirrels can carry the infection without dying from it, as CRAIG SHUTTLEWORTH explains.

In the mid 1990s squirrel pox virus outbreaks were recorded in red squirrel populations in East Anglia and Lancashire, and the devastating disease came to national prominence as a major factor in red squirrel conservation. This virus is carried and spread by grey squirrels without any of these animals developing the disease, but in red squirrels the infection produces ulceration and extensive skin lesions. The presence of such very characteristic symptoms has given the disease a high media profile that has raised public awareness of squirrel pox. It has also unintentionally overshadowed the potential role of other infections in red squirrel ecology.

In 2007 a short research paper was published in the journal *Veterinary Record*, describing the sudden deaths of red squirrels which had been infected not by pox, but by an adenovirus. It was fortunate that veterinary pathologists were able to examine one particular squirrel within hours of its death, as within the intestines they discovered lesions caused by the adenovirus. We now know that these lesions are rapidly lost as the gut decays after death, and given the fact that most dead red squirrels are only presented for post-mortem examination more than 24 hours



Courtesy: David Bailey

Red and grey squirrels at a feeder in Faenol estate near Bangor 2013

after death, the signs of disease had previously never been visible. The paper was a turning point in viral research.

During reintroduction studies on Anglesey there had been two occasions when significant numbers of captive animals had died within a matter of weeks. Animals that were the picture of health one day were found a day later either dead or dying. Adults, breeding females, and weaned young were all systematically lost, and despite extensive veterinary investigations no specific cause of death could be identified. No one had screened for adenovirus because project managers were unaware of the virus. In the light of the 2007 paper, retrospective tests on tissues from Anglesey squirrels were started and these began to reveal high rates of adenovirus infection. At the time the national authorities across the UK viewed these new findings as, at best, being of local significance, and in some quarters they were dismissed almost entirely as little more than an unhelpful distraction to the established squirrel pox research focus.

Suspecting that adenovirus might in fact be much more implicated in causing red squirrel deaths, Red Squirrels Trust Wales and the Zoological Society of Wales decided to fundraise in order to find out. They then commissioned wide-ranging screening of captive deaths and some proactive screening of wild red squirrel mortality. Crucially the investigations encompassed cases where a cause of death was already identified and where there were no clinical symptoms associated with adenovirus (e.g. diarrhoea or bleeding in the intestines). The results revealed that 42% of 31 free-living animals looked at were adenovirus positive, with many showing no sign of disease. In captive populations 70-90% of dead animals were found to have the infection. The implications were that adenovirus could be significant, particularly within captive breeding and reintroduction studies, and that some animals may carry the infection without it producing any disease. This suggested either that specific animals were perhaps immune, or that the virus could only produce disease in circumstances when a squirrel was stressed or weakened by another environmental factor.

It then became much more complicated with the discovery that the virus was also carried by other rodents including the grey squirrel.

Grey squirrels, woodmice and virus spread

The first positive cases of adenovirus infection in UK grey squirrels were discovered in Newborough forest on Anglesey, in tissues of squirrels culled in 2006. This finding prompted an obvious first question – do grey squirrels give red squirrels this infection? The answer to this still remains unclear: although the infection is found in red squirrel populations on the Isle of Wight and in European areas where grey squirrels are absent, this does not preclude cross-infection where the two species are present together. We do know that grey squirrels have so far never been found with disease caused by adenovirus, even though surveillance of grey squirrel populations in North Wales has indicated that up to 40-50% might be positive for infection.

Intriguingly, woodmice have now also been found with the adenovirus infection. For example 8% of those caught within red squirrel enclosures, and up to 20% of mice trapped at red squirrel feeders, have tested positive.

Given these findings, we wanted to understand the potential risk that woodmice and grey squirrels pose to red squirrels active in and around hair tubes – the baited, plastic piping containing double-sided tape

Courtesy: David Bailey

Red in a feeder at Plas Newydd on Anglesey.

which is commonly used to assess squirrel abundance. Knowing that red squirrels had crossed the Menai Strait in 2009 and re-colonised mainland woodlands in Gwynedd, we focussed upon a small population established in Bangor University's Treborth Botanic Garden and the woodland stands running westwards into the Faenol estate.

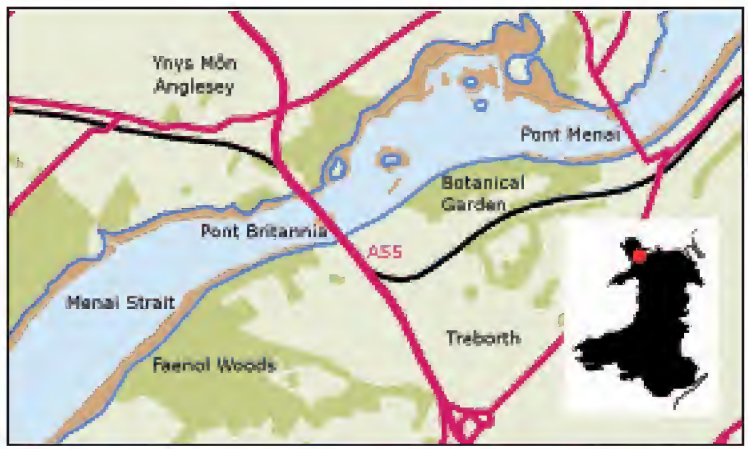
Fifty hair tubes were used to gauge red and grey squirrel population abundance and distribution in 2011-12. The same trial was then repeated over winter 2013-2014 by three students; Sarah Hyde, Bryony Milton and Philip Hennock. They collected several hundred samples of squirrel hairs, including a significant number from red squirrels. Most hair tubes attracted both species. Camera traps set up by three of the hair tubes in 2013-14 confirmed coincident usage not only by both species of squirrel but also by woodmice and several bird species, depending on the bait used. Subsequently we trapped mice under baited hair tubes and found infection in 4% of those tested for adenovirus.

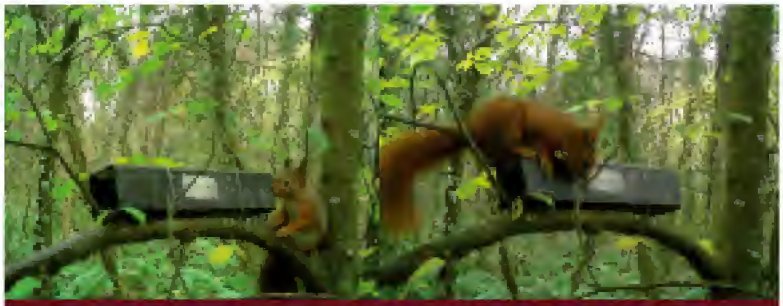
We tried to make the project an integrated part of the wider conservation initiative. For example, all red squirrel hair is being analysed as part of ongoing genetic studies at Bangor University. From the students' perspectives, they were able to learn population monitoring techniques and then think about how methods could be improved, and in particular what the impact of monitoring might be upon the populations they were studying. In this instance, are we increasing the probability of spreading infections? If so, would that apply to live trapping operations too?

What should we do?

So what does the infection of woodmice mean in an applied red squirrel conservation context? Certainly there is a need to regularly disinfect squirrel feeders and also to prevent daily interactions between the three rodents at point-food sources wherever possible. We also need to think carefully about trap disinfection during trapping operations in woodland habitats containing red squirrels.

Live trapping methodologies all include operating baited traps for several weeks (and months within current Glastir prescriptions), firstly to draw squirrels into locations and then to catch them. Set a wildlife stealth camera on a squirrel trap and overnight it will reveal a myriad of visiting woodmice, with the risk of adenovirus inter-species infection. Other species also visit baited traps, most notably bank voles and brown rats. Current UK investigations are focussed upon understanding whether either of these animals can




Bangor University

Cameras record red squirrels at the at hair tube trap in Treborth gardens

carry the adenovirus infection: at the moment we simply don't know.

In Clocaenog forest, a key national red squirrel stronghold, forest managers have reacted to the emergence of adenovirus by evolving existing disease surveillance. Grey squirrels trapped in the commercial conifer stands are now routinely tested for both squirrel pox and adenovirus infection. The data collected give a unique insight into patterns of infection in habitats that typically support low numbers of greys, information that can be compared against ongoing annual surveillance of high density populations in the Arfon district of Gwynedd. Slowly we are gaining a much better picture of the threat that grey squirrels might play in spreading the infection to reds.

We also need to be much more open-minded regarding disease threats to red squirrels more generally. For example, on Anglesey grey squirrels are close to eradication, or may have already been eradicated, and so it would be easy to sit back and think that squirrel pox is no longer an issue. A squirrel pox threat does remain though, and this is because red squirrels have crossed the Menai Straits to re-colonise up to 15km inland into Gwynedd. This fact brings the species once again into direct contact with grey squirrels, opening up the possibility of an infected red squirrel crossing back into Anglesey with pox. This example highlights an 'elephant in the room': the more successful grey control is, and the more numerous a red squirrel population becomes in the landscape, the wider the geographical interface containing the two species becomes. The presence of adenovirus further complicates matters, particularly as there is such a lot that we still do not understand.

There is a pressing need to better understand whether we are dealing with a single viral strain or perhaps multiple adenovirus strains, some of which may be more common in certain rodent species than in others. If we understood this then it may illuminate how the infection cycles within and between the different rodents. This is now a focus of work at Bangor University and we anticipate that future student projects in Treborth gardens will play an important part in it.

How can you help?

Please report any dead red squirrels seen anywhere in North Wales: telephone **07966 150847**, email **Craig.Shuttleworth@RSST.org.uk** or via the www.redsquirrels.info website.

Sickly or dead grey squirrels with evidence of blood or faecal staining around the anus should also be reported, as these symptoms can be associated with adenovirus infection.

Craig Shuttleworth *is an Honorary Visiting Research Fellow at Bangor University and the scientific advisor to the Red Squirrels Survival Trust.*

Adenofirws yng Nghymru

Mae effeithiau firws brech y gwiwerod, y gellir ei drosglwyddo o wiwerod llwydion i rai cochion, gan ladd yr olaf, wedi cael llawer rhagor o sylw na bygythiad arall: adenofirws. Mae archwilio anifeiliaid meirwon yn awr yn dangos y gallai hwn fod yn elfen bwysig ym marwolaeth gwiwerod cochion, yn enwedig mewn poblogaethau a fagwyd mewn caethiwed. Mae cysylltiad posibl, hefyd, â gwiwerod llwydion, a all gludo'r haint, ac â llygod y coed. Mae gan hyn oblygiadau ymarferol: yn y modd y defnyddir maglau ag abwyd, er enghraifft. Er bod darlun yn dod i'r amlwg, mae angen deall llawer rhagor am adenofirws mewn gwiwerod cochion, a bydd hyn yn destun rhagor o waith ymchwil yn Nhreborth, Prifysgol Bangor.

BeeWalk at the Botanic Gardens

Every year, the Bumblebee Conservation Trust (BBCT) recruits lots of volunteers to take part in its BeeWalk Survey. The purpose of BeeWalk is to gain an understanding of the distribution and abundance of the UK's 24 remaining bumblebee species, all of which are vitally important wild pollinators.

Every month, from March to October, volunteers walk a defined route in their local area, identifying and counting all the bumblebees they see. At both a local and national level, this sort of information is crucial to informing decisions about future conservation of our precious pollinating insects.

This year, I decided to take part and conduct one of my BeeWalks at the National Botanic Garden. I am walking a 1.6km route, which takes me from the sheltered Double Walled Garden, up past the Stable Block restaurant-gift shop-gallery complex, and across the Trawscoed North hay meadow in the Waun Las National Nature Reserve. The data I collect will feed into the BBCT scheme and will be useful for the Botanic Garden in assessing which bumblebee species are present and which areas of the site they are visiting.

My first transect in March yielded only one individual bee – a huge queen buff-tail *Bombus terrestris* lumbering over the crocuses planted on the slopes of the dome. She would have been replenishing her reserves after emerging from hibernation, and starting to look for a suitable nest site.

As the spring wore on more and more species emerged, particularly attracted to the swathes of comfrey and other cultivated early flowers in the sheltered walled garden.

Early in the year I found few bees outside the Double Walled Garden, though this changed markedly as the hay meadow at Waun Las sprang into life in May and June. It is so botanically rich (butterfly orchids really are two a penny!) that the bees soon began foraging for pollen and nectar from hay meadow flowers such as birds' foot trefoil, yellow-rattle and red clover.

By July I had recorded most of the common UK bees: the garden bumblebee *Bombus hortorum*, the common carder bee *Bombus pascuorum*, the red-tailed bumblebee *Bombus lapidarius*, the white-tailed bumblebee *Bombus lucorum*, the tree bumblebee *Bombus hypnorum* and the early bumblebee *Bombus pratorum*.

My walk in June caused great excitement with the discovery of a far less common species. Whilst in the Double Walled Garden I spotted two specimens of a bee with which I wasn't familiar. Its lack of pollen baskets and a large elongated shape suggested a cuckoo bee, and closer inspection revealed it was Barbut's cuckoo bee *Bombus barbutellus* – uncommon throughout the UK and rarely recorded before in Wales. Cuckoo females invade the nests of social bumblebees and kill or subdue the queen, taking over the nests and using the workers to raise their own young – as in the bird species of the same name.

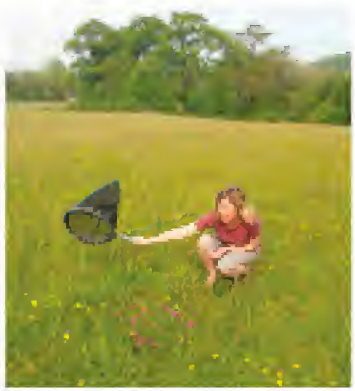
Barbut's cuckoo bee is associated with the garden bumble bee but is larger with less distinct yellow bands. Cuckoo numbers are always lower than their hosts, maintaining a delicate balance between the species, and they are no less beautiful. This record was exciting, both for myself and the Botanic Garden, and for better understanding of the distribution of this scarce and probably under-recorded species.

In late August I will expect to see male bees, which emerge towards the end of the colony's life, and perhaps some beautiful new queens busily foraging and building their reserves prior to hibernation and the start of a new bumblebee year.

If you see me wandering with a net, a bug pot and some bee books, please do stop and say hello. I'll be delighted to talk and maybe show you a beautiful bee or two.

To find out more about the BeeWalk scheme or about the very straightforward BeeWatch survey visit **http://bumblebeeconservation.org/get-involved/surveys/**

Clare Flynn



Habitat Management

2014 has been an interesting summer. The old saying "The more we learn, the less we know" rings true as we observe the behaviour of Himalayan balsam in the third year of management on a site. Our work on vegetation control, advisory visits and writing management plans has made us more aware than ever of the need to constantly juggle our management priorities as we decide which species and threats we attempt to preserve or control. As land managers we need to take responsibility for the impact our decisions have on the world around us.

We work low and slow enough with our little tractor, or pulling by hand, and have the opportunity to be close to many plants and other wildlife. This is an attribute we pride ourselves in - making it possible to cut bracken around a flowering orchid plant, to drive around an anthill, avoid a spider's nest on a clump of rush and even leave a sleepy grasshopper in peace on a coarse grass stem.

When controlling invasive plant species on habitat land some native plants, invertebrates and small mammals are disturbed by the activity we are contracted to do. It can feel like a conflict of interest working on a site at what should be 'the wrong time of year'. However, left unchecked, the invasive species would do more damage than we do. Despite my heightened awareness of the life around me as I spend more time in the field, I have found that my sympathy towards the horsefly has not altered!

This autumn it is with great pleasure that we return to Pen y Graig Goch on the edge of the Brecon Beacons. Dr Ruth Watkins describes the importance of the farm in her article published in Natur Cymru Issue 30, in 2009 when I worked on the Wildmeadows Project for Flora Locale. The flora and management issues of the site are described in her article, and five years on, this work continues and evolves, along with grazing by Welsh black cattle and Herdwick sheep.

In conjunction with Glastir and Natural Resources Wales, work being carried out this autumn includes coppicing of hedgerows between the three SSSI fields, the first of a four-year coppicing programme to benefit willow warblers, garden warblers and tree pipits. The control of bramble is ongoing, and there will be coppicing in the woodland pasture to encourage a more diverse age structure. The regrowth of small willows pollarded last year has been used by wood warblers, cuckoos and other birds, so this approach will be continued and carried out on some ash. To preserve marshy grassland, scrub and trees are being removed where they have encroached and reduced the size of the grassland habitat. The cut material is taken off site whilst taking care to cause as little damage as possible; this can be difficult in a very wet season. A strong winch is used to drag material many meters over the surface of the ground, causing less damage to the turf than taking heavy machinery onto wet sites. The heavy logs are stacked and then removed carefully with a small logging trailer during dry weather.

Conservation and Trees

Elevenses!

It is so nice to be able to work on a site that we have known for some time, to see things evolving, and have the pleasure of working on such habitats. As we develop compassion for certain species or habitats, we also do for whole sites.

Conservation and Trees

Removing the heavier logs in dry weather

Ivy Denham
Conservation and Trees

Islands round-up

Ben Porter

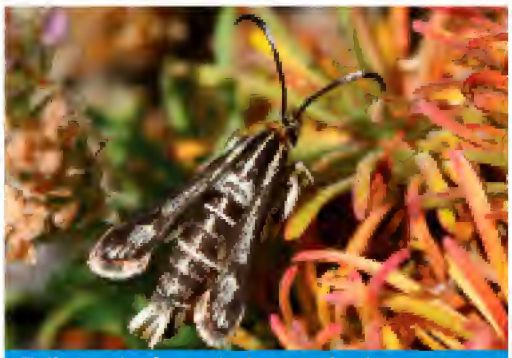
Northern eggar *Lasciocampa quercus* Wylun y grug

Bardsey

Bardsey has a new Island Manager, Rhodri Evans. A fluent Welsh speaker, he has returned to work in Wales after a career in nature conservation which has taken him from Snowdonia to Rum, St Kilda and then North Uist. He's obviously keen on Manx shearwaters. On reaching Bardsey in March he had to cope with extensive roof damage on the island's houses, giving him a steep learning curve!

There is also a new Assistant Warden at the Bird Observatory (BO), Steffan Walton. He spent two months at Fair Isle BO last spring, and was invited back to spend October there, giving him an excellent background for his current post. His particular task on Bardsey in 2014 is to count the island's breeding bird populations.

The excellent and well-illustrated Bardsey Bird Observatory report for 2013 came out in May, beating the majority of county bird reports by months if not years. It includes reports on mammals and invertebrates, including 23 pages on moths written by Ben Porter. Ben and his parents Jo and Steve Porter all live at Ty Pellaf, Steve being in charge of livestock and farming operations on the island. Ben is still doing his A-levels by home education; he is a highly skilled nature photographer and the expert on the island's moths – all the micro-moths are taken to him to be identified. The Report is on sale in Aberdaron, or on request for £12 including postage from **membership@bbfo.org.uk**.


Ben Porter

Thrift clearwing *Synansphecia muscaeformis* Cliradain clustog Fair

Ramsey

After the midwinter gales, RSPB wardens Lisa and Greg Morgan returned to find the grass on the northern fields scorched by salt spray funnelling up the cliffs. By March, the island looked as though it had been bleached silver, and the central fields were completely waterlogged after exceptional rain. The Welsh mountain ewe flock had not been put to the ram in 2013, which was just as well because a dry summer in 2013 and a high rabbit population had kept the grass short.

Staff on all the Welsh islands with Manx shearwater colonies are studying their migration and feeding movements in various ways. On Ramsey small GPS devices are being fitted to shearwaters for this purpose, the problem being how to accurately find the end of a long burrow so a turf plug can be cut above the nest burrow. When the plug is lifted, the bird can be lifted out and the data down-loaded. Lisa and Greg have solved this by using a technique employed in New Zealand to study Hutton's shearwaters; they are installing artificial drainage-pipe burrows, each leading to a wooden nestbox. This makes handling the birds to fix and read the tags an easy task.

Visiting

Visitors to Bardsey can spend a week self-catering at the Bird and Field Observatory, or rent one of the other houses from the Bardsey Island Trust for a week. There are also regular day trips to Bardsey and to Ramsey.

*Collated by **Geoff Gibbs** using information from island staff.*

Linking Natural Science Collections in Wales: Summer 2014 update

The *Linking Natural Science Collections in Wales* project has recently passed the half-way point and, with that, some impressive achievements. The three-year project aims to implement the concept of a Distributed National Collection (DNC) in Wales. The DNC forms a central element of the Welsh Museums Strategy, conceived under the direction of CyMAL, the Welsh government's body responsible for culture and heritage.

The Welsh Museums Federation leads on the project *Linking Natural Science Collections in Wales*, which is funded by the Esmee Fairbairn Collections Fund. During its first phase the project established partnerships with 20 museums across Wales: from Holyhead Maritime Museum to Scolton Manor, from Wrexham Museum to Caldicot Castle. The project partners have in common that they all hold natural science collections, are all accredited museums and are all members of the Welsh Museums Federation.

AC/NMW

Sawfish rostrum found during the collections review at Tenby Museum

First we assessed the scope of each collection, and developed a collections review methodology. The methodology relies heavily on significance assessments and is very quick and easy to learn and apply. Most of the collections reviews are now completed, with the help of specialist curators from Amgueddfa Cymru/National Museum Wales, assisted by local volunteers and staff.

The collections reviews established the current extent of Welsh natural science collections. They have unearthed some amazing gems; for example a world-class geology collection at Radnorshire Museum, a holy rhubarb leaf at Abergavenny Museum, a scallop shell containing a miniature sea-weed herbarium at Carmarthenshire County Museum, and a penguin from Shackleton's Antarctic expedition at Cyfarthfa Castle Museum.

These collections are now being made publicly available through Peoples' Collection Wales, which draws together the digital collections of Wales's heritage organisations. But the project is more than a mere collections digitisation exercise. Collaborations were established with the education sector, specifically Cardiff University, leading to a number of highly successful volunteer projects, and to Coleg Cymraeg Cenedlaethol, which has enabled Welsh-language summer project placements at Oriel Ynys Môn and Ceredigion Museum. The next step is the development of education materials to enable schools to interact more closely with their local museums.

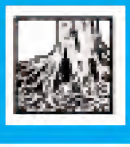
The provision of training in the care and management of natural science objects has helped partner museum curators and volunteers get to know and deal with their natural science collections. This is already paying off, as demonstrated by the impetus the project has already given to the Welsh museums sector.

Tenby Museum was the first to react to *Linking Collections* with their own natural science exhibition, featuring their fabulous antiquarian books with drawings of local natural history, side-by-side with specimens from their natural science collection. This was swiftly followed by a project involving artists using the natural science collections at Ceredigion Museum, an artist-in-residence using the Geology collections at Radnorshire Museum, a new Geology display at Llandudno Museum, and a further natural history exhibition, centred around life on the sea shore, at Tenby Museum.

Links have been strengthened between museums, and discussions have been sparked to review and coordinate collecting strategies between museums, another step towards the Welsh DNC.

At the recent conference of the international *Society for the Preservation of Natural History Collections* the Welsh culture minister, John Griffiths, called *Linking Natural Science Collections in Wales* a 'flagship project'. The project is now providing inspiration for other, similar projects across the UK.

***Christian Baars** is Project Manager, Linking Natural Science Collections in Wales, Federation of Museums and Art Galleries in Wales.*



Woods and forests

*In June this year **Jerry Langford**, the Wales Director of Coed Cadw (the Woodland Trust), addressed a forum of business people, politicians and Civil Servants keen to see investment in railways, tele-communications and… a new motorway across the Gwent Levels. Here is an edited version of what he said.*

Infrastructure is important. The Woodland Trust owns more than 1,000 woods and we too work in the world of planning consents, Environmental Impact Assessments, protected species licensing and public consultation. We are, of course, champions and users of sustainably produced timber, and forestry needs infrastructure too; nothing sexy, just an adequate, basic rural road network would help.

So why are we out with the campaigners? We are selective, we campaign specifically against destruction of *ancient* woodland and trees. Ancient woodland is irreplaceable. Its soils have been developing since post-glacial times, without cultivation. It's that hugely complicated and little understood soil ecosystem, plus the cultural history and the archaeology of ancient woodlands, that make it impossible to re-create. This leads us to a position of zero tolerance: no damage is acceptable. I'm pleased to note that Planning Policy Wales (Feb 2014) acknowledges that it is irreplaceable and should be protected from development that would result in significant damage.

These are the red lines: don't destroy what can't be replaced. So critics can pick their word for us: unreasonable, uncooperative, naive, arrogant, uncompromising, unrealistic, simplistic. But really there is no other intellectually coherent position to take, given a heritage that is both irreplaceable and scarce. It is not for the Woodland Trust to decide that this bit of ancient woodland here must be protected but that bit over there can be sacrificed. We cannot do deals to allow some to be destroyed in order that other bits are protected.

This is no more than the application of sustainable development, the 'Brundtland definition' being: *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs*. This contains a social justice dimension, and embodies red lines in the idea of environmental limits. Biodiversity offsetting also has to recognise these same red lines. You can only 'offset' the destruction of habitat that is inherently replaceable or substitutable. Unless that is accepted, the concept of biodiversity offsetting is dead in the water.

The definition of unsustainable development (or business as usual) might include destroying assets and not passing them on to future generations; marginalising stakeholders; not taking responsibility for wider impacts and passing costs on to others; ignoring the red lines and environmental limits; and more road traffic.

Campaigners are telling us what it is they care about and fear losing; that they are not prepared to be excluded from the decision making; and that they will hold us to account on the impacts of what we propose. They won't go away, and this is what sustainable development means in practice. We need to listen.

More green infrastructure is a basic, fundamental requirement. We need to be better at delivering attractive and functional green infrastructure and soft engineering, and in the process create new habitats that will be as robust and diverse as many we have inherited from the land management of the past.

Perhaps with infrastructure we need to do less, do it better and make it count for more. Welsh Government Ministers have often said that we must aspire to achieve both economic development and environmental protection, and have given Natural Resources Wales the challenging task of facilitating both objectives. We support this integration as a step towards sustainable development, but surely those whose task it is to deliver economic development must also raise their game and commit to the same combined objective, rather than continue to assume environmental degradation is an acceptable trade-off?

In the Woodland Trust we are always interested in exploring partnerships outside of the environmental sector. The best response to campaigners is to provide a vision that inspires them. If that is of interest, get in touch – if you can accept our red lines.

Footnote: just after the conference the Welsh Government announced plans to spend £1bn on a new motorway across the Gwent Levels. This will completely destroy one ancient woodland and cut through four SSSIs.

www.woodlandtrust.org.uk
01476 581111

Green **Bookshelf**

Deep Country – Five Years in the Welsh Hills
Neil Ansell
Penguin Books
2011
Paperback £6.99

In the 1840s Henry David Thoreau spent two years living very simply in a log cabin beside Walden Pond, Massachusetts, and then wrote about the experience. The resulting book was hugely influential in terms of attitudes towards the natural world and became a classic of American literature. It also established a genre of 'escape to the country' books which has had countless imitators. In Wales the best known are probably Thomas Firbanks' *I Bought a Mountain*, Elizabeth West's *Hovel in the Hills* and Ruth Janette Ruck's *Hill Farm Story*, while more recent contributors have been Jay Griffiths and George Monbiot.

Deep Country, as its title implies, is very much in the same tradition. Neil Ansell is a journalist who takes five years out to live, or rather camp, in an almost derelict keeper's cottage somewhere in mid-Wales, with neither electricity nor running water, and no transport or telephone. "I wanted to know how lightly I could tread on the earth" he says, in a phrase that could have come straight from Walden. Like Thoreau, Ansell tries to be self-sufficient, learning to grow vegetables and herbs and becoming adept at foraging for mushrooms and berries, bottling much of his produce for the winter. Unlike Thoreau, he is neither thinker nor navel gazer. "Solitude did not breed introspection, quite the reverse," he remarks, but instead he becomes totally absorbed in the present and the natural world around him. His days are spent watching and observing in a state of what he calls heightened alertness and he is witness to some extraordinary events. Re-reading his journals much later he discovers that "I have disappeared entirely from my own narrative; my ego had dissolved into the mist. I came to the hills to find myself and ended up losing myself. And that was immeasurably better."

What is unusual about this book is how little we learn about the author and his background. The trials and tribulations of such a life-style are skimmed over in a matter-of-fact manner; midges are not even mentioned. His few human contacts do not have names but remain The Farmer or The Doctor. The Welsh language does not feature anywhere. Ruined farms and the depopulation of which they speak are noted but not commented upon. The Cambrian mountains are recognized as "sheep-wrecked" terrain but still relished for their emptiness and isolation. The author's attention is focused firmly on the non-human life going on all around him.

He watches hares, stoats, badgers, foxes, bats, mice, at all seasons and in all weather. But really the book is about birds, in particular raptors. Buzzard, peregrine, kestrel, kite, sparrowhawk, goshawk, even a hobby, he sees them all and becomes familiar with their lives and patterns of behaviour. And he writes about them beautifully in spare, simple prose that never strives for effect in the way that sometimes mars the writing of Richard Mabey and Robert Macfarlane. Accept it for what it is, a natural history of a tiny corner of the planet recorded with love and attention, and this is a wonderful book, literally, and recommended to anyone with the slightest interest in birds or, indeed, the outdoor world.

Rob Collister

Atlas of Dragonflies in Britain and Ireland
Michael Shrubb
T & AD Poyser
London 2013
256pp
Hardback £50

The first thing to say about this excellent book is that it is much more than an atlas. It also provides easily accessible scientific information on dragonfly ecology, environmental factors affecting dragonfly distribution, such as climate, and a comprehensive account of dragonfly habitats. This is all provided in full colour and the design of the book is a credit to its authors, sponsors and publishers.

The records which have been collated for this atlas were collected by volunteers, many of whom are members of the British Dragonfly Society (BDS), amassing over one million individual records now lodged in the Dragonfly Recording Network and DragonflyIreland. The processing of these data into valuable scientific information shows

the power of citizen science in Britain and Ireland today.

Each individual species account is set out over several pages and provides information on the wider distribution of the species, its habitat, conservation status and national trends. I particularly like the photographs of typical habitats for the species, which brings the text alive for me.

The distribution maps follow the example set by the recent BTO Bird Atlas (reviewed in *Natur Cymru* No. 51), with symbols showing, at a hectad (10x10 km square) scale: recent and old gains; recent and old losses; and where the species has remained stable since the last atlas was produced in 1996. *Natur Cymru* readers will be able to see many clear changes for our Welsh species such as the hairy dragonfly *Brachytron pratense*, which is now much more widely distributed across the country.

The detailed analysis of trends in the distribution of species provides a fascinating read. The analysis concentrates on comparing records from 1991-1999 and 2000-2012 and then with older records. The records are so good that we can, for example, see the spread of the small red-eyed damselfly *Erythromma viridulum* from its first record in Britain on the east coast in 1999 to much of the south and east of Britain by 2012, including South Wales.

This book is a collaborative effort of the BDS working with the Biological Records Centre, the Centre for Ecology and Hydrology and the Joint Nature Conservation Committee (JNCC). It is a superb book, which will appeal to all lovers of the natural world but importantly will also provide robust evidence to guide the conservation of these colourful and intriguing insects and their wetland habitats.

David Parker

Puffins
Euan Dunn
Bloomsbury Publishing 2014
£9.99 softback

Yes, another book on puffins but who can quibble about this? A wild bird which probably has more books about it than any other. There can be few birds so easily identified, so loved, so very special. As the author says: *A major puffin colony, pulsing with movement, colour, sound and smell, all part of the everyday drama of raising offspring, is one of the most exhilarating assaults on the senses these islands can offer.*

Without question one of the great puffin experiences occurs each spring when the birds return to their colonies after a winter at sea. How fortunate we are in Wales to have the most important puffin colonies in southern Britain so easily accessible on the islands of Skokholm and Skomer.

Indeed it was on these islands that R M Lockley carried out research into the life-history of puffins and subsequently wrote his monograph on this iconic seabird, published in 1953. Unfortunately this has been overlooked and is not even mentioned in the present work, which is a pity, as indeed are index references to Skokholm and Skomer amongst other premier colonies.

Having grumbled, I do urge readers to purchase this title in the RSPB Spotlight series – you will not be disappointed. If you know someone who has yet to visit a puffin colony, the book is an ideal present. They will surely be lured just as you have been.

David Saunders

Slugs of Britain and Ireland
Ben Rowson, James Turner, Roy Anderson & Bill Symondson
FSC Publications, £14.50
136 pages, softback

I guess most readers only encounter slugs when confronted by their depredations in the garden and, as far as identification goes, are simply 'black slugs' or 'brown slugs'. Want to know more about these notorious plant pests, and indeed their control? Then purchase this comprehensive and superbly illustrated full colour guide including distribution maps.

Some 46 species have been recorded of which no fewer than 37 occur in Wales, with the Pyrenean dusky slug, Silurian soil slug and Sicilian slug being restricted to the Principality. We are informed that more money is spent on dormouse and newt surveys in a year than has ever been spent on slug recording. This new guide will surely encourage more people to take a closer look at slugs than was previously the case.

David Saunders

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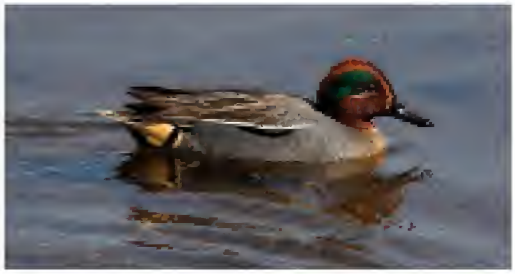
Birdwatching Walks in Gwent
Al Venables, Andrew Baker, Dave Brassey, John Coleman, Chris Field, Verity Picken, Steph Tyler
Gwent Ornithological Society 2013, £11.99, 239 pages, softback

For over half a century I have regularly travelled across South Wales from Pembrokeshire to Gloucestershire and back. First using the A40 with its many delights – not forgetting the traffic horrors before improvements – then the speed of the M4, so that Gwent was barely noticed.

All changed in 2000 with the opening of the Newport Wetlands Reserve, created as part of the compensation for the destruction of the Taff/Ely SSSI by the wholesale changes to Cardiff Bay. I was lured, as many others have been, by the ornithological delights of the Reserve, the Goldcliff Lagoons and the Uskmouth Reedbeds, and as a result have explored other parts of this splendid but often overlooked county.

As part of its 50th anniversary celebrations the Gwent Ornithological Society published this excellent guide which describes 55 bird-watching locations: from Afon Lwyd at Cwmbran to Ysgyryd Fach (Little Skirrid) near Abergavenny; from Bargoed Woodland Park in the west to Highmeadow Woods in the east; from Sluice Farm on the Severn Estuary to Llanthony Valley in the far north; each superbly described and with excellent maps. Add to these a supporting cast which includes chapters on habitat, the birding year and the Gwent Bird List, and this guide contains everything you need to know when bird-watching in Gwent.

David Saunders



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